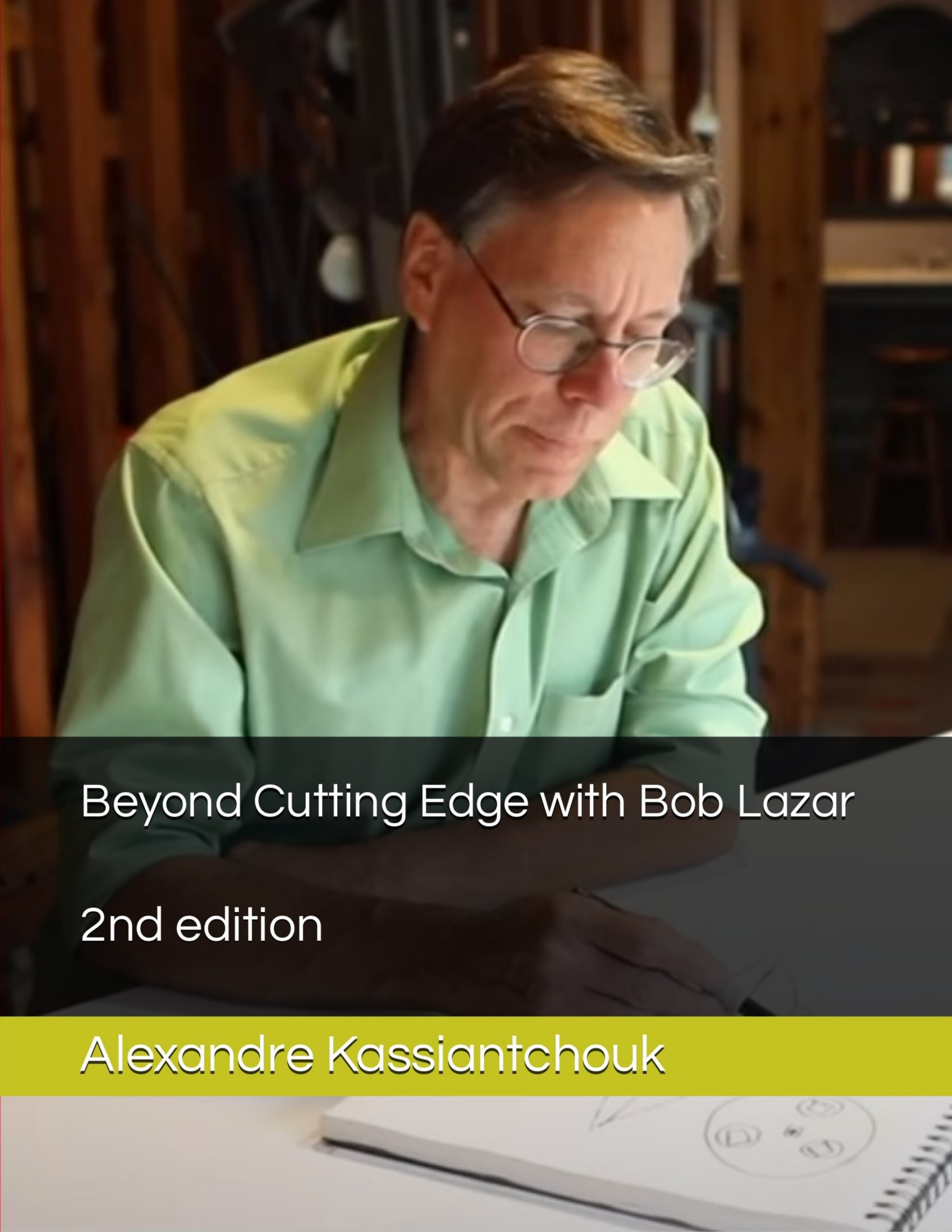


Beyond Cutting Edge with Bob Lazar

2nd edition

Alexandre Kassiantchouk

Beyond Cutting Edge
with Bob Lazar

Second Edition

Copyright © 2022-2023 Alexandre Kassiantchouk

All rights reserved.

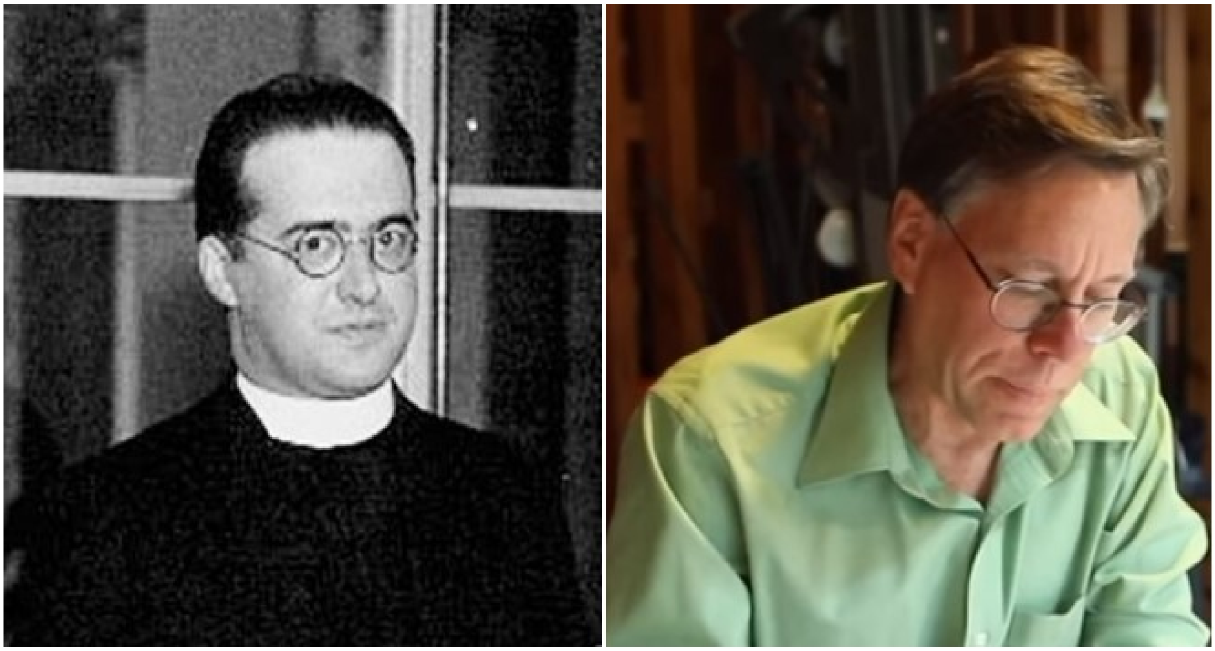
ISBN: 9798862245509

TABLE OF CONTENTS

1. TIME DILATION AND REDSHIFT 1
2. SPIRAL GALAXIES AND DARK MATTER 8
3. BLACK HOLES OR “NEARLY BLACK HOLES” 15
4. TIME IS THE ENERGY OF SPACETIME 18
5. HOW MATTER IS MADE AND WHERE ANTIMATTER IS 22
6. MASSLESS NEUTRINO REHABILITATION 26
7. MACROWORLD AND MICROWORLD LINKED? 29
8. ENERGY MEASURES TIME 32
9. WHAT HAPPENED 65 MILLION YEARS AGO? 34
10. GRAVITATIONAL WAVES AND LIGO DEVICE 38
11. BURNING TIME IN LABS AND IN GALAXIES 41
12. AN ACCIDENT PROMPTED THIS RESEARCH 48
13. BOB LAZAR: FROZEN CANDLE 52
14. BOB LAZAR: INVISIBILE CRAFT AND RADIO COMMUNICATION 60
15. BOB LAZAR: TOUCHING WORKING CORE AND AVOIDING HIGH-Gs 63
16. BOB LAZAR: CRAFT FLIGHT PHYSICS 66
17. BOB LAZAR: ELEMENT 115 68
18. BOB LAZAR: GRAVITY AND STRONG FORCE 75
19. REFINING THE BIG BANG DEBUNKING EXPERIMENT 80
20. JOULES AND ENERGY CONSERVATION 83
21. LIFE HACKED TIME 85
22. WHEN FLYING SAUCER MEETS MATTER 89
23. UAP ≠ UFO 95
24. THERE IS NO EVENT HORIZON 97
25. ERIC LERNER: NO BIG BANG IN JWST IMAGES 99
26. MATERIALS USED IN FLYING SAUCERS 101
27. EXTRAORDINARY STABILIZING POWER OF TIME DILATION 107
28. GAMBLING AND NOBEL PRIZE FOR PHYSICS 111
29. TIME = AETHER / ETHER FOR REAL 116
30. REFRIGERATOR IS IMPOSSIBLE BY THERMODINAMICS! 118
31. REVERSE ENGINEERING “UFO’S REVERSE ENGINEERS” 120
32. GIFT FROM ZETA RETICULI 123
33. NEWTON'S RINGS TEACH US A LOT, ESPECIALLY NOW 128
34. EGYPTIAN PYRAMIDS START MAKING SENSE 133
35. PLANCK's CONSTANT WAS SMALLER IN THE EARLY UNIVERSE 140
36. TIME SPEEDS UP IN THE UNIVERSE, BY WHAT FORMULA? 143
37. REAL ASYMMETRY OF TIME IN OUR WORLD 145
38. UNREALISTIC EINSTEIN AND DOGMATIC MODERN PHYSICS 147
39. SECOND LAYER IN BOB LAZAR's CRAFT SHIELDING! 150
40. OBSERVER IN PHYSICS: REALITY VS. ILLUSION 152
41. MIND BLOWING EVOLUTIONARY EXPERIMENT 157
42. TIME DILATION AND CLIMATE CHANGE 158
43. MERCURY PRECESSION WITHOUT SPACE BENDING ILLUSION 165
44. MORE ABOUT GPS AND TIME DILATION 169
    Time dilation is written in stone now. 169
45. COSMIC WEB: REAL AND ILLUSION 173
46. INTERSTELLAR TRAVELER OUMUAMUA MYSTERY SOLVED 178
47. LOW-COST MARINE BUOYS VS. EXPENSIVE GPS SATELLITES 181
48. WHERE DOES ENERGY COME FROM AND GO TO? - TIME! 184
49. ONE PAGE DIGEST ON TIME PHYSICS 186
50. MICRO-IDEA ON ANTIMATTER WHEREABOUTS 187
51. GALAXIES, NOT THE BIG BANG, ARE BIRTHPLACE OF MATTER 190
    Or how did galaxies appear? 190
52. NO MORE ANTIMATTER ENIGMA 196

SCIENCE AND TECHNOLOGY GREATEST STORY, BIG BANG OR BOB LAZAR'S?

Since the last century there are two narratives, two big stories about our world, and each story actually denies the other.

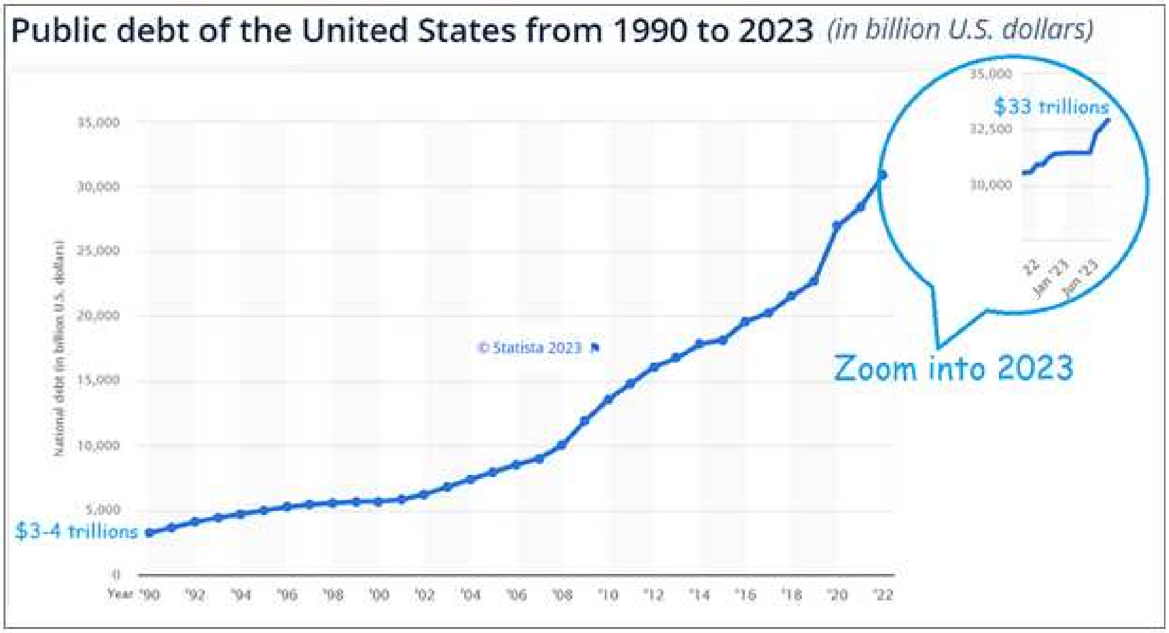


The first one is the Big Bang story told by a Belgian Catholic priest Georges Lemaitre and originally promoted in the scientific community by George Gamow, a Soviet and American physicist. This story became the mainstream in science, media, and even for the Church as an alternative consensus on World Creation.

The other story was leaked by Bob Lazar about reverse engineering of alien anti-gravitational craft. It was originally published by journalist George Knapp in the 1990s. Bob Lazar claimed that strong (nuclear/atomic) force is basically the same as gravity, and one can be converted/scaled into another, and this way gravity can be manipulated around the craft. That did not go well with the Big Bangers, and **mainstreamists dismissed Bob Lazar's tale as anti-scientific and completely false.**

Now, 30 years later, and after James Webb $10-billion-telescope staring into our Universe past and not seeing Big Bang, and after $20-billion-CERN looking at Big Bang from inside — from particles perspective, **we can vouch that Big Bang is anti-**

scientific and completely false story. And these $30 billions were in old money, not in today's helicopter money that are 10 times cheaper:



https://www.statista.com/statistics/187867/public-debt-of-the-united-states-since-1990/

On the contrary, this book explains the physics of Bob Lazar observations, astronomers' observations in our old Universe, in our own Milky Way and in other galaxies. And it provides even more realistic than accepted perspective on our world:

- Spacetime is regular Space filled with Time, and not 4-dimensional surrogate
- Time is Quantum Fluctuations, like Temperature is Brownian Motion
- Gravity is Time Pressure (Chapter 18)
- Milky Way and Bob Lazar's craft use the same propulsion
- There was no Big Bang
- Galaxies were materialized by burning time, with shooting-star-like fireworks of matter, with such events randomly scattered in space and in time (check chapter 51 on how).
- Matter/antimatter imbalance is local to a galaxy, but balanced in the Universe.

Reading this book does not require advanced knowledge of physics. A teenager with the help of a science teacher or with the help of the Internet can understand it. Understanding reflection and refraction would be enough to start with. This book can be read in two ways. Chapter by chapter - but that might be boring to you. Better try another way: read chapter 1 to get a grasp on time dilation, redshift, and refraction. Then jump to chapter 13 and continue reading there, sometimes going back to earlier chapters when they are referenced. Engineers, check chapter 30 first: like a fridge once impossible, Bob Lazar's craft becomes possible. Everybody else check chapter 39 first: it gives a general impression on how physics solves Bob Lazar’s story.

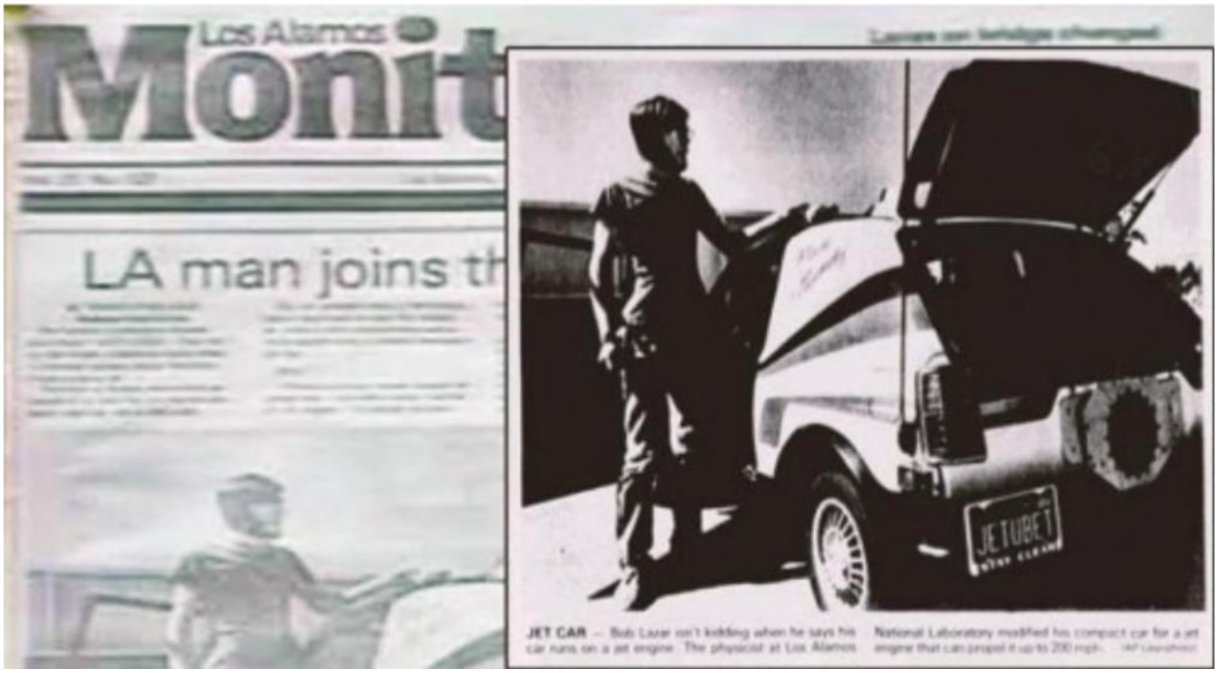
BOB LAZAR VS. ELON MUSK ON JRE – REVEALING STATS

Top shows on JRE (Joe Rogan Experience):

- *Joe Rogan 5 years ago: with Elon Musk 68M views => 13.6 M/year*
- *Joe Rogan 4 years ago: with Bob Lazar 56M views => 14 M/year*
- *Joe Rogan 3 years ago: with Elon Musk 32M views => 10.7 M/year*

Both Bob Lazar and Elon Musk are hands-on physicists, both engineered or reverse-engineered vehicles, weird vehicles, once unbelievable, and something flying.

Bob Lazar was 23 in this 1982 Los Alamos Monitor article about his jet car, which got him and Dr. Edward Teller acquainted:



Los Alamos Monit

LA man joins th

JET CAR — Bob Lazar isn't kidding when he says his car runs on a jet engine. The physicist at Los Alamos National Laboratory modified his compact car for a jet engine that can propel it up to 200 mph.

6 years later, Bob got a contract with EG&G at S4 / Area 51 thanks to Dr. Teller's recommendation:

https://www.youtube.com/watch?v=8PCRxIG9Enk

Which led to this:

Full story on JRE:

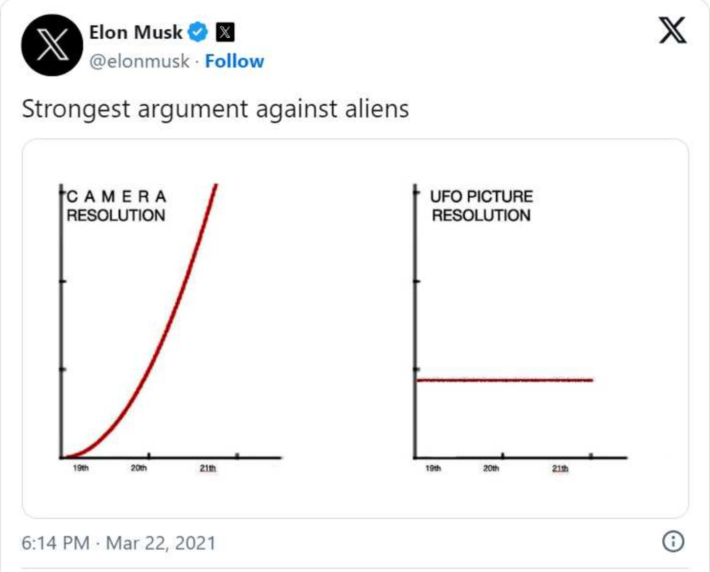
Joe Rogan Experience #1315 - Bob Lazar & Jeremy Co...
Watch later
Share
Area 51 • Area 51, secret U.S. Air Force military installation located at Groom Lak...
THE JOE ROGAN EXPERIENCE
#1315
BOB LAZAR &
JEREMY CORBELL
Watch on YouTube

https://www.youtube.com/watch?v=BEWz4SXfyCQ

Elon Musk started kind of the same way, with maintenance free electric cars, like Jay Leno did, and like some 1900's New Yorkers did:

https://www.youtube.com/watch?v=OhnjMdzGusc&t=206s

But Elon Musk doubts UFOs because of the fuzzy images:



Elon Musk
@elonmusk

Strongest argument against aliens

6:14 PM · Mar 22, 2021

https://twitter.com/elonmusk/status/1374167754404630528

In this book, we'll see how gravity as time dilation, and refraction caused by time dilation, explain that.

1. TIME DILATION AND REDSHIFT

"We can't solve problems by using the same kind of thinking

we used when we created them."

Albert Einstein

"Time Dilation" means slowing down time or clock. Such feature of time was discovered by Einstein theoretically and then confirmed in real life. Two reasons or cases for time dilation are very well known and compete against each other inside Geolocation satellites. One discovery states time slows down near massive objects. For example, time runs faster at our head level than at our feet level - because feet are closer to Earth. Another discovery states time slows down for any moving object. Geolocation satellites require high precision in measuring time to come out with right coordinates. On their orbit time runs faster than on Earth because satellites are farther from Earth. But because satellites move fast, time slows down there as well. Calculations (in Chapter 47) show that altogether satellite clock speeds up. Because of this, satellite clocks are made to run slower intentionally, so when on the orbit, they speed up and stay in sync with the time on Earth.

"Redshift" means regular light that is usually white, for some reason, for some observers looks red. "Blueshift" is a similar concept when light emitted as white appears bluish to an observer. Physically that means redshifted light wave became longer when received, and blueshifted light wave became shorter when received. Doppler found that when light emitter and/or receiver move away from each other (does not matter one or both move away, or one moves closer but another runs away faster) then the received light is redshifted compared to the emitted. And when light emitter and receiver move in direction to each other (closing the distance between them in any way) then the light is blueshifted when received.

Chapter 1. TIME DILATION AND REDSHIFT

Group of astronomers led by Hubble found that majority of galaxies look reddish when observed in telescope. And the farther these galaxies from us, the redder they look to us. Their measurements were summarized in the theory stating that our Universe is expanding, and its expansion accelerates. That was expressed by formula

$$V = H_0 D$$

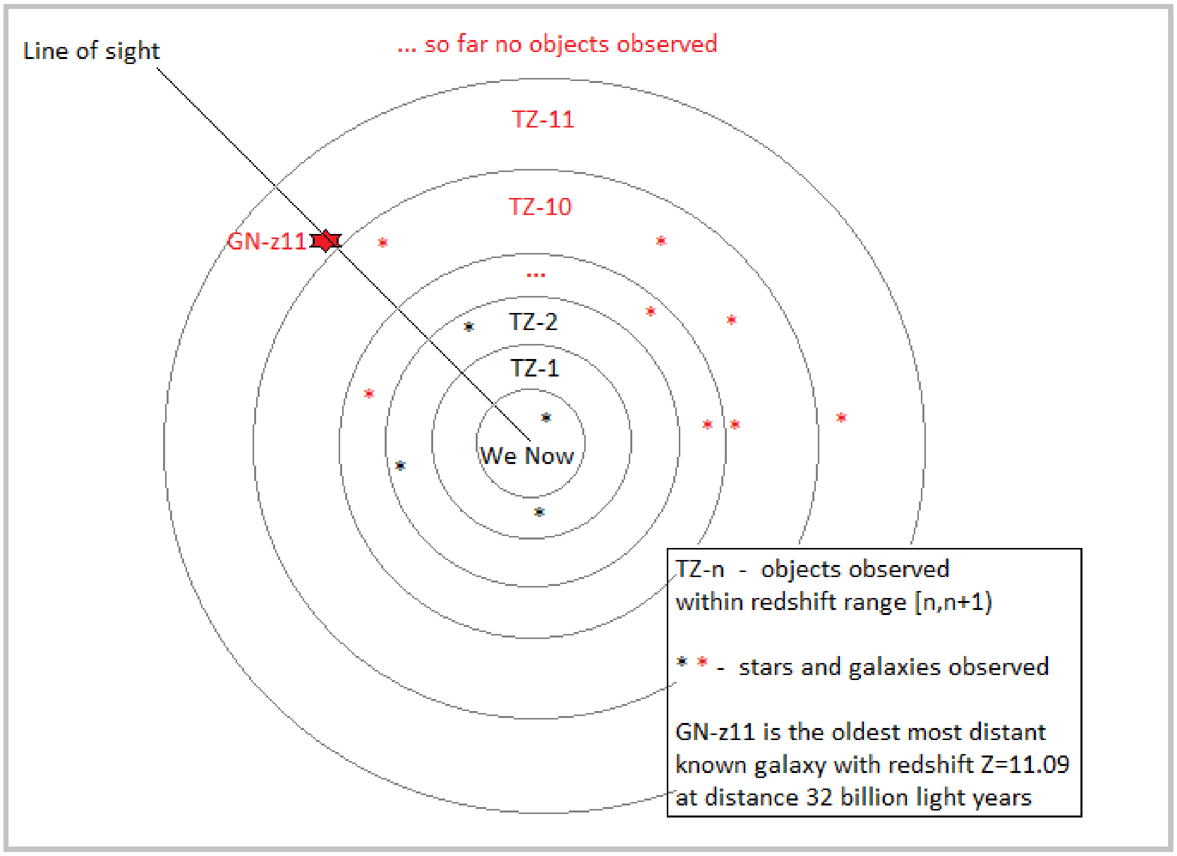
V – Recessional velocity, H_0 – Hubble's constant, D – Proper distance. Hubble's constant is about recession rate and its value is around 70 km/sec / Megaparsec. Its reverse value ($1/H_0$) that is about 14 billion years is better known as the approximate age of our Universe. There are some issues with the theory of the accelerated expansion of Universe. If it was true then the later in time, the faster space expands. And there is nothing later than here and now, so scientists measured how fast space is expanding around us – on Earth, in Solar system, and in our Milky Way. **And no expansion has been detected!** And what our bodies – shall they expand with age too?

So, the first task: Explain starlight redshift, the farther star the more reddish it is, without the space expansion. And how our new solution can be verified?

My solution: **Time was slow in the past, and it speeds up since.**

We'll work with Z = (Wavelength received / Wavelength at the source) – 1.

If wavelength of the light did not change then $Z = 0$, if redshifted then $Z > 0$, if blueshifted then $Z < 0$. Z-value is called redshift. Starlight observations look like this:


Line of sight
... so far no objects observed
TZ-11
TZ-10
GN-z11
...
TZ-2
TZ-1
We Now
TZ-n - objects observed within redshift range [n,n+1)
* * - stars and galaxies observed
GN-z11 is the oldest most distant known galaxy with redshift Z=11.09 at distance 32 billion light years

We'll be talking about time now and then and about time running slow or fast. Such talks might be confusing. Let me give you an example of such confusing talk at Wikipedia about tidal effects slowing down Earth spinning:

> "700 million years ago Earth day was **22 hours**, and year was **400 days**".

Does it mean that **day is longer now**, but **year is shorter now**? If that is not confusing already, then let's ask what happened to a month – has it become shorter or longer since? Problem is in the language. Let me rewrite the original statement:

> 700 million years ago, **their day** lasted 22 **our hours**, and **their year** lasted 400 **their days** – meaning Earth spinned faster (rotation around Sun is not discussed).

Coming back to our task – how can we compare time passage now and then. For this, some kind of message is used – from the past to now. Let say, and I'm making those numbers up for now, real numbers will come later:

10 billion years ago time was 2 times slower (real numbers will come later)**.**

What does it mean and what is the measurement for this? It means the following:

If someone who lived 10 billion years ago took **10 sec** of his time to send me a radio signal of 100 harmonics (100-wave signal), then on my radio this signal lasts 20 sec.

In other words, clocks are ticking twice faster now – time is twice faster now. What does it mean if expressed by a frequency of the signal at the source and at the destination:

- At the source frequency was 100 harmonics / 10 sec = 10 Hertz
- At the destination it became 100 harmonics / 20 sec = 5 Hertz
- That means frequency dropped twice. As for the wavelength that means it doubled – because the wavelength is in reverse to the frequency (by Einstein's formula, frequency multiplied by wavelength gives the speed of light constant). In the terms of redshift that means Z+1 = 2 or Z=1:

  Z = (Wavelength received / Wavelength at the source) – 1 = 2 – 1 = 1.

This example helps to build intuition that slowness of the time in the past can be rated in 1+Z, which is the ratio of the wavelength received to the wavelength sent. New explanation for GN-z11 observation at the map above now will be:

32 billion years ago time was running 12 times slower than it runs today.

And to understand or calculate that about GN-z11, there is no need to know anything about time zones in between. Hubble's and his followers' measurements can be reused for such new explanations. And since there is no expansion of the Universe in my model, there is the only one distance to the stars, and not three types of distances as from Hubble's model.

Now to the second question - how to prove my model? Let's think back – Hubble's constant 70 km/sec / Megaparsec for expansion rate was derived from redshift observations. Megaparsec is 3,262,000 light years. Let's recover redshift from Hubble's constant using known formula:

$$Z = (1+V/C)^{1/2} / (1-V/C)^{1/2} - 1$$

Here V is recession speed and C is the speed of light 300,000 km/sec. When V/C is a small value, the formula above is simplified to

$Z = V/C$

Hubble's ratio (x×70 km/sec) / (x×3.262,000 ly) for x = 1 / 3,262,000 means that recession speed in 1 year is

$V = 70 / 3,262,000$ km/sec,

thus,

$V/C = 70 / 3,262,000 / 300,000 = 7.153 \times 10^{-11}$.

Original Hubble's measurements were about redshift observed literally.

$Z+1 = 1+7.153\times 10^{-11}$ a year.

So, in-lab experiment to confirm that time speeds up can be the following:

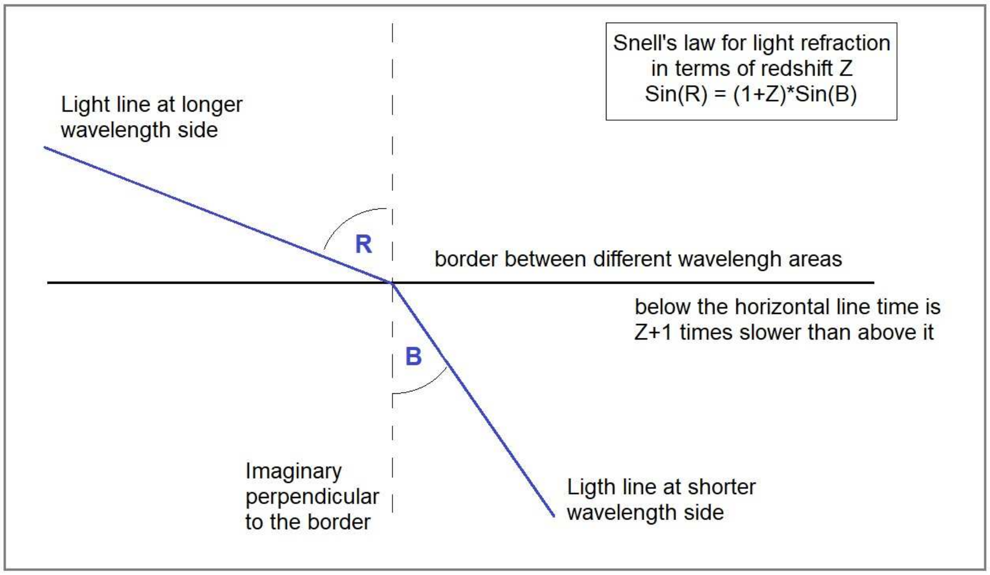
Loop a laser light (using mirrors). Measure its wavelength at the source once. Let it run for one year, without any retransmission – signal measured in a year should be the original – not retransmitted. Measure its wavelength in a year. If received light wave is $1+7.153 \times 10^{-11}$ times longer compared to what was year before, then we have in-lab proof. Please be accurate with the tools used – frequency/wavelength measurements implicitly rely on some definition of a second. That tool should not cancel out signal change that happens due to time change. I checked what is used as a "second" nowadays – it is defined as the time for some process in Caesium-133 to oscillate 9,192,631,770 times. Interestingly, the anticipated

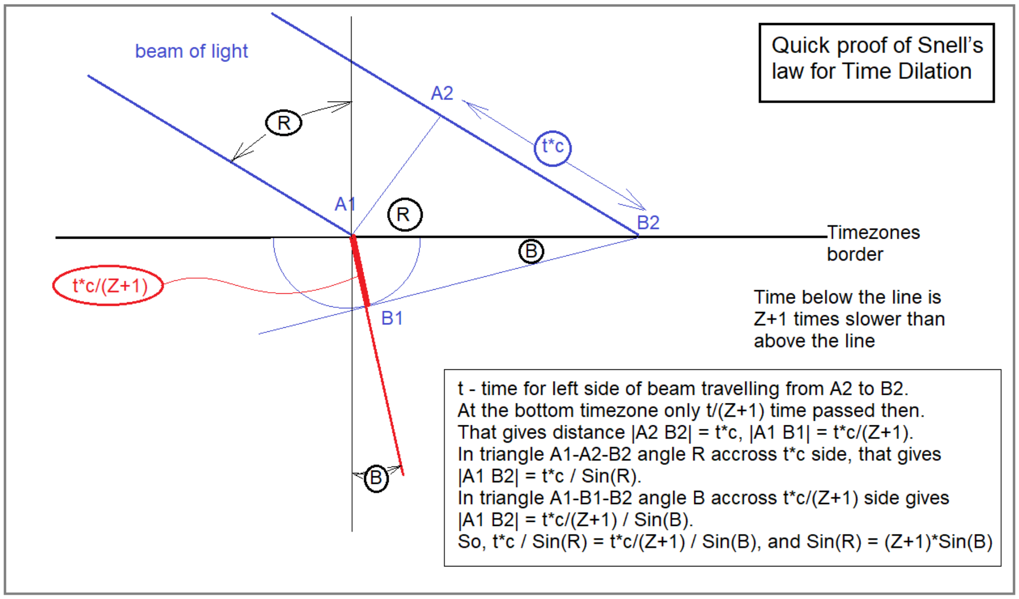
7.153×10^{-11}

delta in time and Caesium-133 clock tick = 1 / 9,192,631,770 are close to 10^{-10} in magnitude. But Wikipedia article about this clock says that its precision is 10^{-16} actually – accurate to a millionth fraction of a tick. That is more than enough for our experiment.

With this theory of no inflation - neither Dark Energy is required to inflate Universe, nor Dark Matter is required to maintain extending Universe density. We got rid of Dark Energy completely. To get rid of Dark Matter completely we are to solve one more puzzle in spiral galaxies (similar puzzle exists for galaxy clusters, but Time Dilation solves them all).

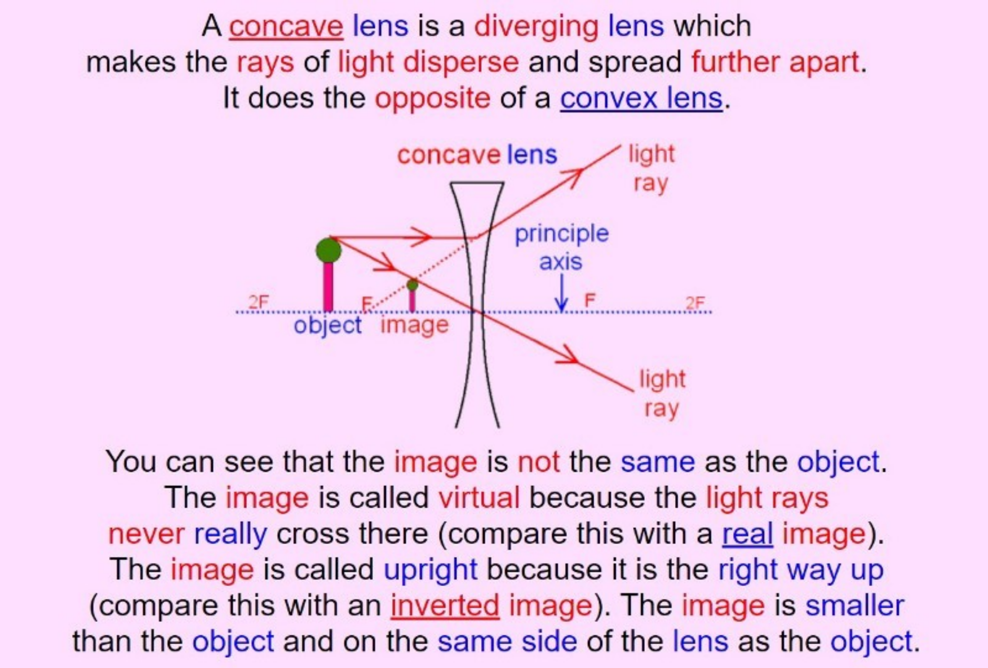
Let’s finish this chapter with a discussion about refraction. When light wavelength changes, then light is refracted by Snell’s formula:





t - time for left side of beam travelling from A2 to B2.
At the bottom timezone only t/(Z+1) time passed then.
That gives distance |A2 B2| = t*c, |A1 B1| = t*c/(Z+1).
In triangle A1-A2-B2 angle R accross t*c side, that gives
|A1 B2| = t*c / Sin(R).
In triangle A1-B1-B2 angle B accross t*c/(Z+1) side gives
|A1 B2| = t*c/(Z+1) / Sin(B).
So, t*c / Sin(R) = t*c/(Z+1) / Sin(B), and Sin(R) = (Z+1)*Sin(B)

If look at timezones’ map, line of the sight is perpendicular to TZ1 – TZ11 borders. For an observer of a distant star, the star looks like a dot. Refraction is not happening when observing the remote star (when looking into the past), because angles R and B in Snell’s formula are both zero. But when observing a distant galaxy, those angles are not exactly zeros, because galaxy has a visible size. Snell's law Sin(R) = (1 + Z) × Sin(B) makes R ≠ B, because (1 + Z) varies from 1 to 12 on the path from the remote galaxies to us. Such refraction is known as concave lensing:



A concave lens is a diverging lens which makes the rays of light disperse and spread further apart. It does the opposite of a convex lens.

You can see that the image is not the same as the object. The image is called virtual because the light rays never really cross there (compare this with a real image). The image is called upright because it is the right way up (compare this with an inverted image). The image is smaller than the object and on the same side of the lens as the object.

https://www.gcsescience.com/pwav29.htm

Image for an observer looks smaller through concave lensing than the object itself. The farther galaxies the smaller they appear to us – much smaller than they would look like without such lensing caused by time speeding up on the way to us. This effect on distant observations was never accounted for, so smallness of distant galaxies is hugely overrated. For example, let's compare how galaxies that are 32 billion light years away from us appear smaller to us than galaxies that are only 14 billion light years away. If not for refraction, they would have appeared 32/14=**2.3 times smaller by distance**, but because of refraction (12 times slower time vs. 2 times slower time) they appear to us (32/14) × (12/2) = **13.7 times smaller**. On top of this, there is refraction/diminishing factor of 2 on the way from 14 billion LY (light years, Z=1) to us. Thus, Z=11 galaxies appear **27.4 times smaller** than they would have looked to us without concave lensing effect.

We leave the most interesting question "Why does time speed up?" for a later chapter, where the essence of Time is revealed.

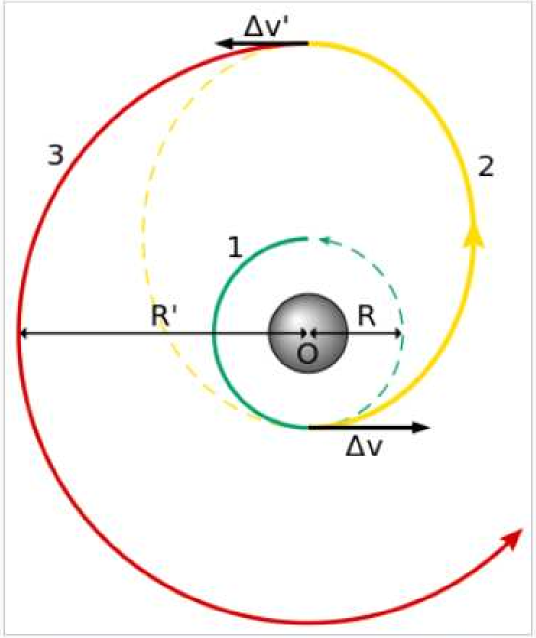
2. SPIRAL GALAXIES AND DARK MATTER

Everybody is fascinated with the beauty of spiral galaxies with bright spiral arms. Their shape is very stable and lasts for billions of years and rotates very slowly compared to the stars rotating through the arms again and again. Milky Way – our home galaxy is a spiral galaxy too, and our Sun and Earth are in Orion Spur of the Sagittarius Arm at the moment, but we'll get out of the arm in a few million years. There is one long standing problem – when astronomers (Vera Rubin especially) measured velocity of some stars near the perimeter of spiral galaxies, they found it was too high – stars should have flown away from the galaxy if stars' trajectories were circular. To explain how these stars are retained in their galaxies some scientists suggested that galaxy itself is in some ball-shaped cloud of Dark Matter, which provides additional gravitation pull to retain the stars. No such Dark Matter was "measured" or "discovered" so far. And when more data about stars' trajectories was collected – the theory collapsed.

How stars move in Spiral Galaxies? You can find computer animations that were built of the measurements and see that stars move like a fish school – often changing direction and velocity, amazingly synchronous, and without collisions. Dark Matter ball cannot do such schooling – it can drive stars in circular orbits only. You can say "Programmers got it all wrong". But in 2010 very precise measurements from our galaxy came, let me quote https://phys.org/news/2010-11-milky-stars-mysterious-ways.html:

"… by an international team including several researchers from the Strasbourg Astronomical Observatory: near the Earth, stars move towards the exterior of the Galaxy at an average speed of around 10 kilometers per second, which is considerably faster than previously thought… The researchers were thus able to ascertain that the average speed of stars towards the exterior of the Galaxy increases with their distance from the Sun in the direction of the Galactic center, reaching 10 kilometers per second at a distance of 6,000 light years from us (in other words, 19,000 light years from the Galactic center)."

Let me describe this observation in other words: while looking from Earth down into Milky Way center astronomers noticed some stars rush from their low orbit to a higher orbit. That is known as "Hohmann transfer orbit" - when a satellite is given a thrust to get to a higher orbit:

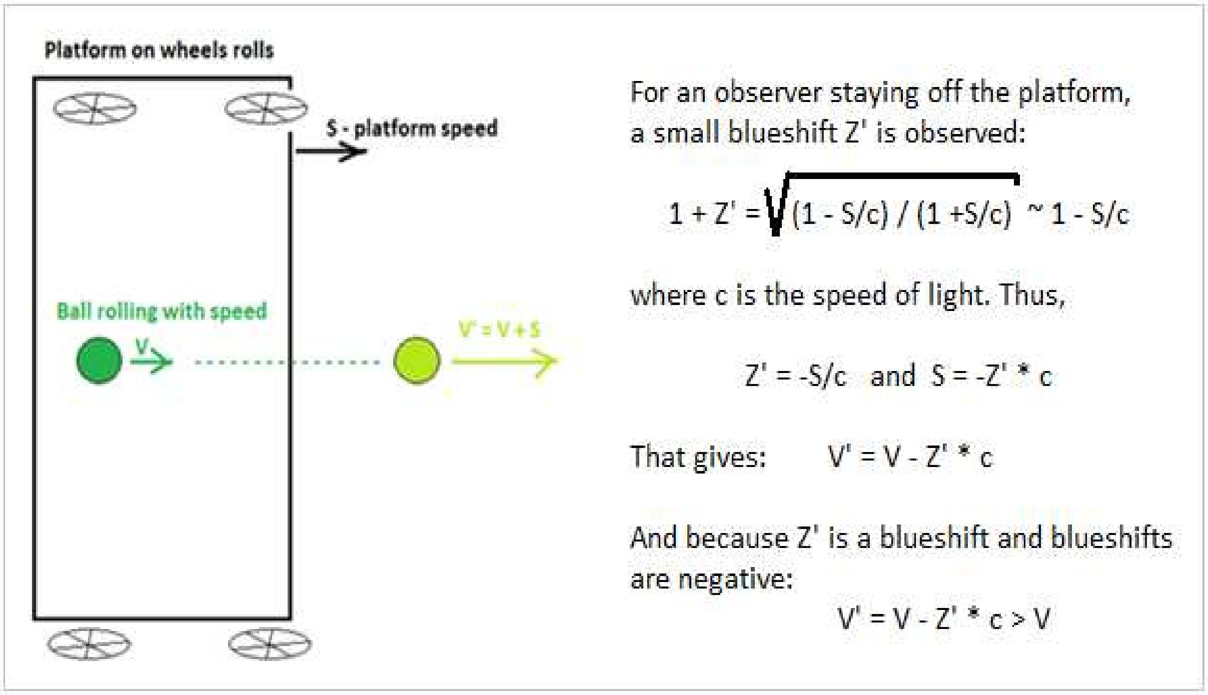


Hohmann transfer orbit, labelled 2, from an orbit (1) to a higher orbit (3)

See animation at https://en.wikipedia.org/wiki/File:Animation_of_InSight_trajectory.gif

For such satellite to stay on a higher orbit, another thrust is required when the higher orbit reached. Otherwise, the satellite continues down by its elliptic orbit, fluctuating between two “heights”. And in reverse - if the task is to lower a satellite from a higher circular orbit to a lower circular orbit: one thrust in the opposite to the movement direction first, then another thrust in the opposite to the movement direction when the lower orbit is touched. Without the second thrust, the satellite will continue by its elliptic orbit, oscillating between two “heights”. Later we’ll see that for a star in a spiral galaxy, its velocity is boosted when the star exits a spiral arm, and its velocity is reduced when the star enters another spiral arm. Now we have to find what gives such thrust to the stars in spiral galaxies, and the value of it.

Let’s return to the Doppler redshift and time dilation. Let’s look at a simple imaginary task of calculating velocity of a ball falling off a moving platform:



For an observer staying off the platform, a small blueshift Z' is observed:

$$1 + Z' = \sqrt{(1 - S/c) / (1 + S/c)} \sim 1 - S/c$$

where c is the speed of light. Thus,

$$Z' = -S/c \quad \text{and} \quad S = -Z' * c$$

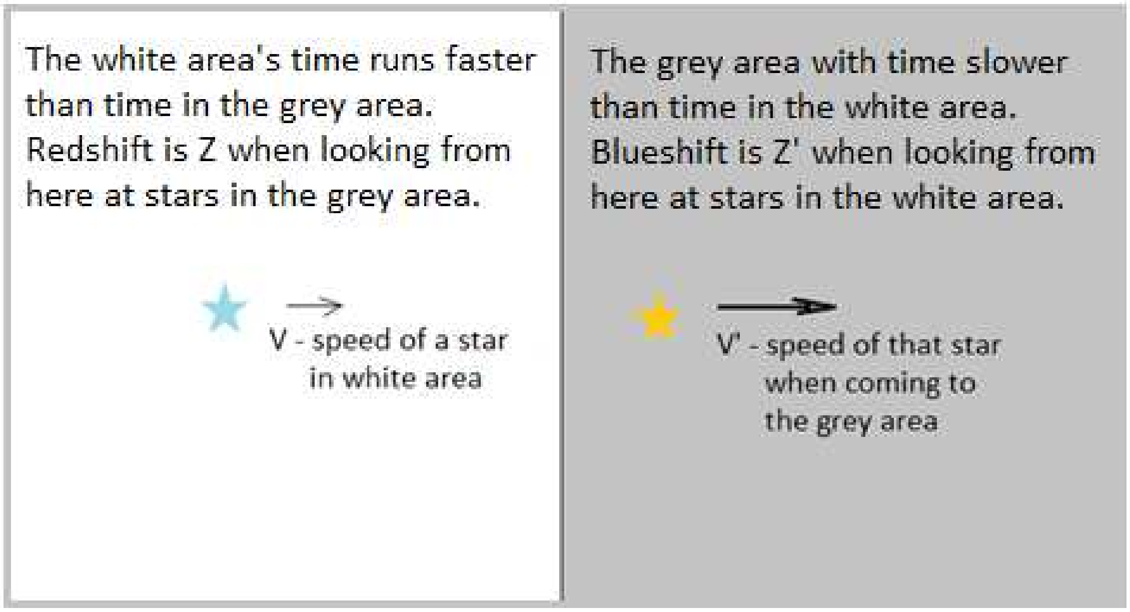
That gives: $V' = V - Z' * c$

And because Z' is a blueshift and blueshifts are negative:

$$V' = V - Z' * c > V$$

Now let’s look at the same task when the reason for blueshift between two timezones is not because of Doppler effect, but because of time running differently in the white (at the left of the drawing below) and in the grey (at the right of the drawing below) zones. Let Z’ be blueshift observed by someone staying in the grey zone and looking to the white zone and Z is redshift observed by someone staying at the white zone looking at the grey zone. Z and Z’ are related by Z'=-Z/(1+Z) formula, so for small Z:

$$Z' = - Z.$$


The white area's time runs faster than time in the grey area. Redshift is Z when looking from here at stars in the grey area.
V - speed of a star in white area
The grey area with time slower than time in the white area. Blueshift is Z' when looking from here at stars in the white area.
V' - speed of that star when coming to the grey area

From “redshift” perspective, this drawing is equivalent to the previous drawing at page 10. If two cases are the same from redshift perspective – then the impact on trajectories and velocities is the same - why? Basically, it is known since Einstein’s General Theory of Relativity, but was stated in other than redshift terms. It is because time changes cause geodesic changes of space, and light follows altered geodesic layout by taking new fastest path. Redshift (wavelength change) causes refraction by the same reason – light follows the fastest path. Change in geodesic layout impacts all object trajectories. In a sense, this observation is similar to mass equivalency by Einstein – gravitational and inertial: the cause of gravity is not some force but in geodesy. So, we can just reuse math from the previous drawing at page 10: $V' = V - Z' \times c$. And since $Z' = - Z$ we get the following relation between velocities of the object when it crosses timezone border:

$$\mathbf{V' = V + Z \times c}$$

The above formula is for non-relativistic velocities V and Z × c – when redshift Z is close to 0. For relativistic velocities, we need to use another formula, which I put at the end of this chapter, and add velocities using Einstein’s formula for velocity addition.

Coming back to the Spiral Galaxy problem – the solution is in timezones: **time in spiral arms runs faster than outside the arms (in grey areas). Or time in grey areas is slower than in spiral arms.**

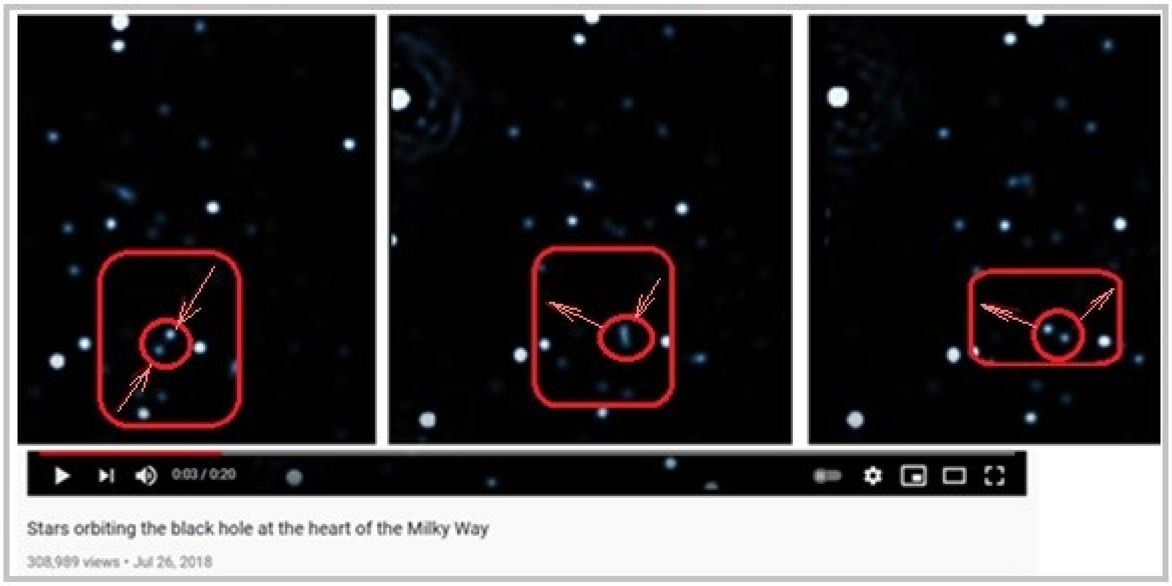
Here are several facts confirming time difference between arms and non-arms:

1) Arms are brighter - because time runs faster, stars burn faster, highlighting the area of the faster time.
2) “White and blue” stars are more common in the arms and “yellow and reddish” stars are more common in the grey area – it is because arm / not arm areas are blueshifted / redshifted to each other.
3) There is an impression that new stars being born when entering the arms, and an impression that some stars die when leaving the arms. The actual reason is different and it is good to discuss it here. Some stars of Spiral Galaxies are on the edge of a critical mass, their burner is either flickering, or goes on and off. By now we understand: when time speeds up, the probability of certain events goes up, in this case – the probability of Hydrogen atom collisions in a star. That ignites a star that was off, and was on the edge of a critical mass - when such star enters an arm where time runs faster. And when such star exits an arm, its burner goes off again – thus, for an external observer, star dies on exiting the arm.

And even more. We already explained why stars move in a fish school manner, using “Hohmann transfer orbit” and by the formula **$V' = V + Z \times c$** (velocity boost happens when star exits an arm – enters a grey area, and velocity is reduced by $Z \times c$ when star enters an arm). Why stars do not collide on such maneuver? Two reasons for this:

All stars’ velocities change by the same value **$Z \times c$** (and they try to follow changed geodesic lines);

Another reason, and it was recently confirmed for the stars at the center of Milky Way, stars are saved from the collisions by their magnetic field pushing them away when they come close. They are repelled like the same polarity's magnets when coming close to each other. See screenshots from a video posted on Youtube that shows two stars on the collision course and how they bounce off each other:



Stars orbiting the black hole at the heart of the Milky Way

308,989 views • Jul 26, 2018

And now coming back to Vera Rubin's paradox, when she plotted observed maximum velocities of stars by distance R from the center of a galaxy, she received velocities like that:

VERA RUBIN'S DELTA + Const × $R^{-1/2}$ + Fluctuations

Apart from Const × $R^{-1/2}$ that comes from the gravitational pull, the rest we already figured out in this chapter:

- Fluctuations come from "Hohmann transfer orbit" and non-circular orbits
- The puzzling constant VERA RUBIN'S DELTA is **Z×c** constant of the boost!

From VERA RUBIN'S DELTA of a specific spiral galaxy we can find redshift between arms and grey areas of this galaxy:

Z = VERA RUBIN'S DELTA / c

Please take a moment to appreciate that a small redshift ~1/c has a profound effect on the galactic processes: it switches stars on and off and messes up all orbits. Vera Rubin measured velocity at the perimeter of five dozen galaxies, results were at 100-300 km/sec range, half of them around 300 km/sec. That gives Z around 0.001. What a big impact should be anticipated for larger redshift values. Meaning, what a profound effect should be anticipated when time differences are big. When we were calculating the boost value S, we rounded formula

$$1 + Z = (1 + S/c)^{1/2} / (1 - S/c)^{1/2}$$

for small values of redshift Z. Let's do exact calculations for Z>>0:

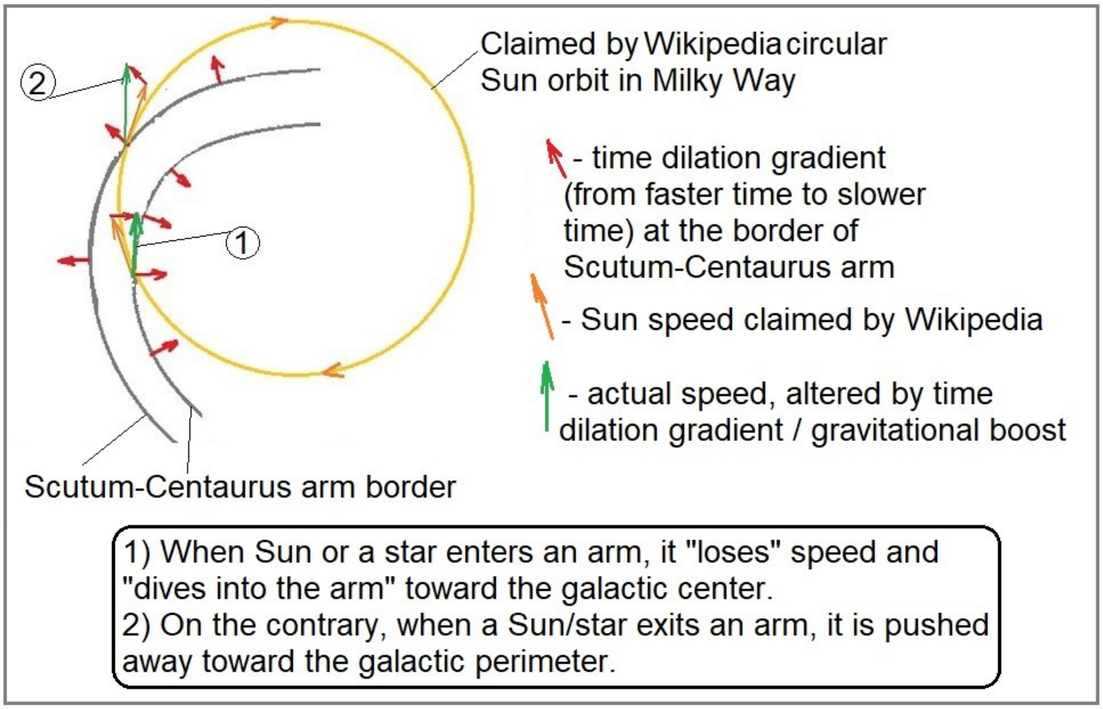
$$(1+Z)^2 = (1 + S/c) / (1 - S/c) \ \mathbf{=>} \ (1+Z)^2 \times (1 - S/c) = 1 + S/c \ \mathbf{=>}$$

$$(1+Z)^2 - (1+Z)^2 \times S/c = 1 + S/c \ \mathbf{=>} \ (1+Z)^2 - 1 = (1+Z)^2 \times S/c + S/c \ \mathbf{=>}$$

$$2Z+Z^2 = (2+2Z+Z^2)\times S/c \ \mathbf{=>} \ S/c = (2Z+Z^2)/(2+2Z+Z^2) \ \mathbf{=>} \ S = (2Z+Z^2)/(2+2Z+Z^2)\times c$$

That gives us the formula for relativistic boost $\mathbf{(2Z + Z^2) / (2 + 2Z + Z^2) \times c}$. It is comparable to the speed of light when Z>1.

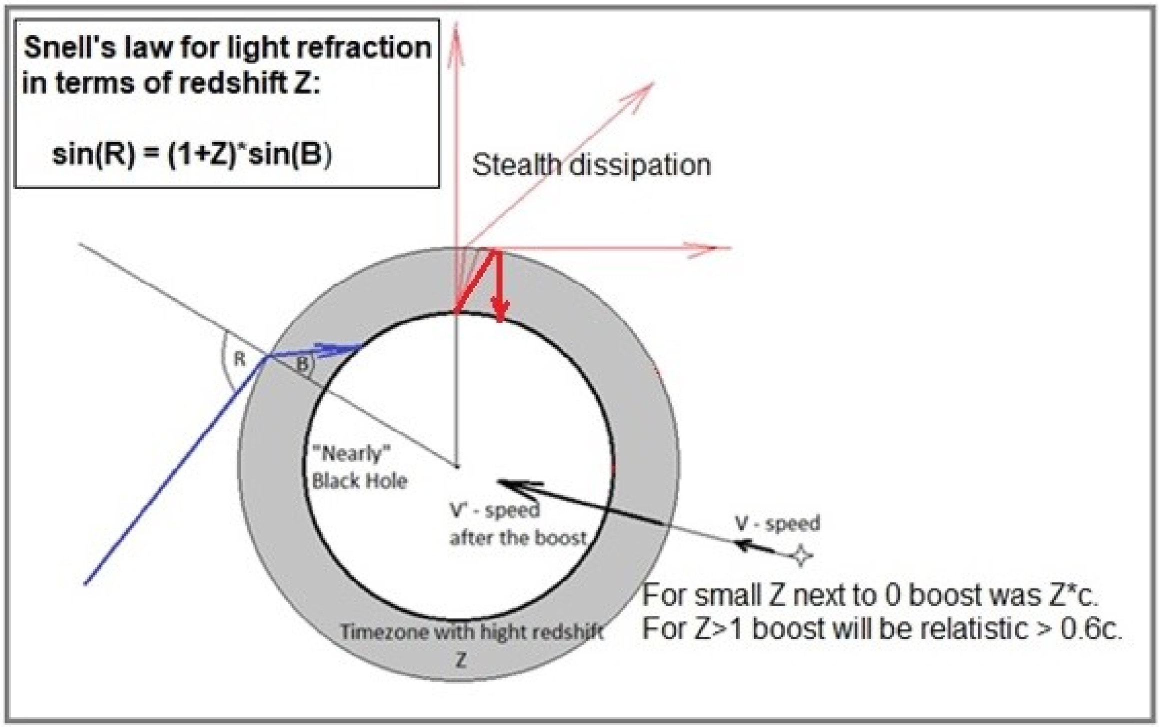
On pages 76-78 we will learn that boost comes from time dilation impact on quantum fluctuations. For now, we understood spiral arms influence on Sun trajectory:


②
Claimed by Wikipedia circular Sun orbit in Milky Way
①
- time dilation gradient (from faster time to slower time) at the border of Scutum-Centaurus arm
- Sun speed claimed by Wikipedia
- actual speed, altered by time dilation gradient / gravitational boost
Scutum-Centaurus arm border

1) When Sun or a star enters an arm, it "loses" speed and "dives into the arm" toward the galactic center.
2) On the contrary, when a Sun/star exits an arm, it is pushed away toward the galactic perimeter.

3. BLACK HOLES OR “NEARLY BLACK HOLES”

Let’s talk about very dense dead stars, many physicists call them “Nearly Black Holes”, but when in public just “Black Holes”. There is almost no functional difference. There is so-called “gravitational time dilation” near such stars, and we don’t care about dilation type, all we need to know that time dilation is very strong around there.


Snell's law for light refraction in terms of redshift Z:
sin(R) = (1+Z)*sin(B)
Stealth dissipation
R
B
"Nearly" Black Hole
V' - speed after the boost
V - speed
For small Z next to 0 boost was Z*c.
For Z>1 boost will be relatistic > 0.6c.
Timezone with hight redshift Z

Why very dense stars look dead, why the lights are out? It is not because of “event horizon” - through which light cannot escape, but because time has slowed down all processes in this star – fission, fusion, with probability of particles hitting each other coming down despite high density. So mass is not critical enough to lighten up the star when time crawls. That is why lights are out. The same we learned in the previous chapter: time dilation slows down or switches off some processes by reducing probabilities of events. And vice versa – when time speeds up then less probable becomes more probable and some processes start or resume.

Let’s talk about refraction - it is very strong around there, and any light passing close by (blue line in the drawing above) will definitely hit ground (the surface of the dead star). And even if it is reflected from the surface (like at the red lines’ origin on the drawing) – only a narrow angle of the light can get out – and even if it gets out, it will be dissipated over a half of the Universe (thin red arrows in the drawing). Most of the light (bold red line in the drawing) is reflected back and hits the ground (the surface of the dead star). By the way, stealth aircrafts are designed by the same dissipation principle – only infinitesimal part of the radiation comes back to radar.

In the previous chapter we calculated relativistic boost:

$$(2Z + Z^2) / (2 + 2Z + Z^2) \times c$$

which is close to the speed of light when Z>>0, thus, any approaching object will be torn apart and smashed.

“Nearly Black Hole” and theoretical “Black Hole” are much alike from public perspective. Differences are: “Nearly Black Hole” can have magnetic field; it has neither event horizon, nor information destruction, nor evaporation – all theoretical problems that “Black Hole” has. So why do some career scientists are so attached to Black Holes? I presume it is because some of them look for missing antimatter there. Let’s show that Black Holes are not the solution to why our Universe is made of matter (only or mostly). Though it is true that there are zillions of “Black Holes” (or “Nearly Black Holes” – difference does not matter in the context of missing antimatter) and statistically many of them might have collected some excess of antimatter. But that means only some of zillions black holes have some excess of antimatter and a lot of others have excess of matter, and statistically – probability plays with **ONE** object only that is our Universe – single Universe should have matter and antimatter almost in balance statistically (and local holes’ statistics does not change global statistics). Let’s remember this failure to explain why our Universe is made out of matter, though we almost succeeded in putting some of antimatter into some holes. We failed to solve matter-antimatter problem because we looked down - we should have looked up. That we’ll do later in this book.

Chapter 3. BLACK HOLES OR “NEARLY BLACK HOLES”

Practical question: “What will happen with dead stars in the future?” The first chapter showed that Time speeds up in Universe, thus, probability of events grows; dead stars will reignite slowly first, as neutron stars perhaps. Then race with time begins:

- If such star burns out faster than time speeds up, then probability of events goes down because material goes down faster than time speeds up. Then such star will shut down again, waiting for faster time period.
- If time speeding up causes slow burning dense star to speed its burning too fast, then star may go supernova.

If compare with our Sun’s process – our Sun burns out at 10^{-14} rate a year, and with time speeding up at 10^{-10} magnitude a year – our Sun will be fine for a while.

Let’s say a few words about Black Holes (or Nearly Black Holes) in the center of Milky Way and in the other galaxies. There are plenty of dead dense stars around, but in the center of our galaxy something as heavy as 4.5 million of our Sun was found. Is it a big deal? Our galaxy is estimated to have 100-400 billion stars, and our Sun is an average star in Milky Way. That translates the discovery of super massive black hole into: “Dead star with ~ 0.003% of the galaxy mass was found in the center of Milky Way”. It sounds not as impressive as it was put on the news and common people got a wrong impression that the main pull-together was found. Combined gravitational pull of the stars at the center of the galaxy (its bar or disc) and additional time dilation from between the spirals are bigger players now.

Please check chapter 24, which debunks Event Horizon and Black Holes - they “appeared” due to a math mistake, recently discovered by Dr. Vivian Robinson. And there is more evidence for the continuity of space.

4. TIME IS THE ENERGY OF SPACETIME

Energy is one of very few quantities that should not change in total. That feature is qualitative in the first place (rather than quantitative):

- Energy cannot be created from nothing (from zero energy).
- Energy cannot disappear (into zero).

Quantitatively energy is expressed by some formulas that might have issues because of factors/constants used and due to reliance on some units of measurement that are supposed never to change. There a lot of other troublemakers, like changing frame of references can change all measurements, and when comparing two types of energy sometimes we don't know how to convert one into another – apples to oranges. Because of this, it is always easier to start with "relational" formulas, rather than with exact formulas. Let's take, for example, the two most known formulas on particle's energy. If particle has mass, then there is Einstein's formula relating energy E and mass m of a particle at rest

$E = m \times c^2$ - where c is the speed of light (300,000 km/sec).

And for massless particle like photon its energy E is related to wavelength by Planck-Einstein formula:

$E = \hbar \times c$ / wavelength

where $\hbar$ is Planck constant (6.626×10^{-34} m^2 kg sec^{-1}) and c is the speed of light. (There is combined formula as well, but we are not going there). First of all, it is very difficult to measure mass of a particle at rest without any interference. Secondly, those units of measure rely, for example, on "sec" to be constant, but is it? Sometimes it takes decades to come out with right factors / constants for such formulas. But for qualitative results, it would be enough to have simple equivalent formulas:

$E \sim m$ (meaning energy is proportional to mass, $E = const \times m$)

$E \sim 1/$ wavelength (meaning energy is in reverse dependency to wavelength, E = const / wavelength).

Qualitative usefulness of such formulas: when particle and antiparticle annihilate, and they had mass, then if we had the first formula only, then energy would disappear – because their masses disappeared. But if to look what they annihilate into – a couple of photons, then having the second formula solves “disappearance” of energy.

Let’s return to our Universe. First impression is that it appeared from nothing, and that violates the energy invariance. So, we need to come out with some energy for vacuum in Spacetime. Maybe there was nothing in sterile vacuum of space, but as we have learned there is Time in Spacetime – and it has “relative” speed. We can compare speed of time in the same volume at different moments of time – as it was described in the first chapter. And we can compare speed of time in neighboring areas, side by side, like it was described in the second chapter. But we can compare relatively - ratio only, and not absolute values. Even if we stick a clock into some area – we won’t know whether this clock ticks fast or slow and at what rate. It is not like thermometer that can measure some gas temperature. Relative speed of time can be measured as redshift. Now, let me just put hypothetical formula (all formulas appear as hypotheses, then comes a long period of justification):

$E_0 = E_Z / (1+Z)$

where E_0 is energy of some space at some time, E_Z is energy of the same space at a different time, or of another space at the same time (or both time and location different) and both spaces are of the same volume (otherwise we have to divide each side by each volume), and

Z is redshift = (wavelength of light sent from Z-area) / (wavelength when received at 0-area) -1

since we know that (1+Z) expresses how time at Z-area is slower in comparison to 0-area time. Now we have some positive energy in every area of Spacetime – clocks won’t tick if energy is zero there. When justifying some formula for a new energy type, scientists try to convert it into another energy type they are used to measure. We are witnesses that Universe figured out how to convert such energy into particles (matter, antimatter, light photons). We'll talk about this process in the next chapter – mechanism is more important than counting energy. There are hundreds of theoretical works on vacuum fluctuations (quantum fields), vacuum instability - here and there and everywhere "virtual" particles and antiparticles appear, and in a next moment they annihilate into "virtual" photons. "Virtually" is for two reasons:

- Before I suggested in this book having energy of Spacetime to be based on Time Dilation there was no workable hypothesis what is the energy of vacuum – theoretically it was zero. Particles and light could not appear from nothing.
- And even if suppose that some vacuum has some energy, nobody showed in lab how to breach the gap between "virtual" and real particles.

Let's say we have figured out how Universe works. Then there are two conclusions:

- Once particles are created, the energy of Spacetime should go down to preserve energy's total.
- There is no known, even theoretical, mechanism for converting these particles back into "nothing".

So Spacetime will be losing energy by producing particles:

$$E_0 < E_Z \quad \Rightarrow \quad E_Z / E_0 > 1 \quad \Rightarrow \quad 1+Z = E_Z / E_0 > 1 \quad \Rightarrow \quad Z > 0$$

$Z>0$ means time speeds up, and now we understand what that means and why – it is because space loses its energy to the matter. And material energy (matter, antimatter, photons) will be gaining the difference. That answers the question "Why does time speed up?" asked at the end of the first chapter. Another interesting aspect: if the described in the first chapter in-lab experiment confirms that time speeds up even now, that means matter-antimatter production is still going on in our Universe.

Now what this Energy formula

$$E_0 = E_Z / (1+Z)$$

reminds of? It is “proportional/relational” to saying that “second in 0-zone became (1+Z) shorter than in Z-zone” or “second today is (1+Z) shorter than it was at the source” or “time now is (1+Z) faster than it was”:

$$\text{Second}_0 = \text{Second}_Z / (1+Z).$$

Now, if divide Energy formula by the above formula, we get:

$$E_0 / \text{Second}_0 = E_Z / \text{Second}_Z$$

That means Spacetime energy E is proportional to a Second:

$$\boxed{\mathbf{E \sim Second}}$$

where **Second** is the unit of time. This formula alone tells “Time is the energy of Spacetime” and it can be relatively measured by the duration of a second or by redshift. **In chapter 35 we’ll discuss more concrete formulas.**

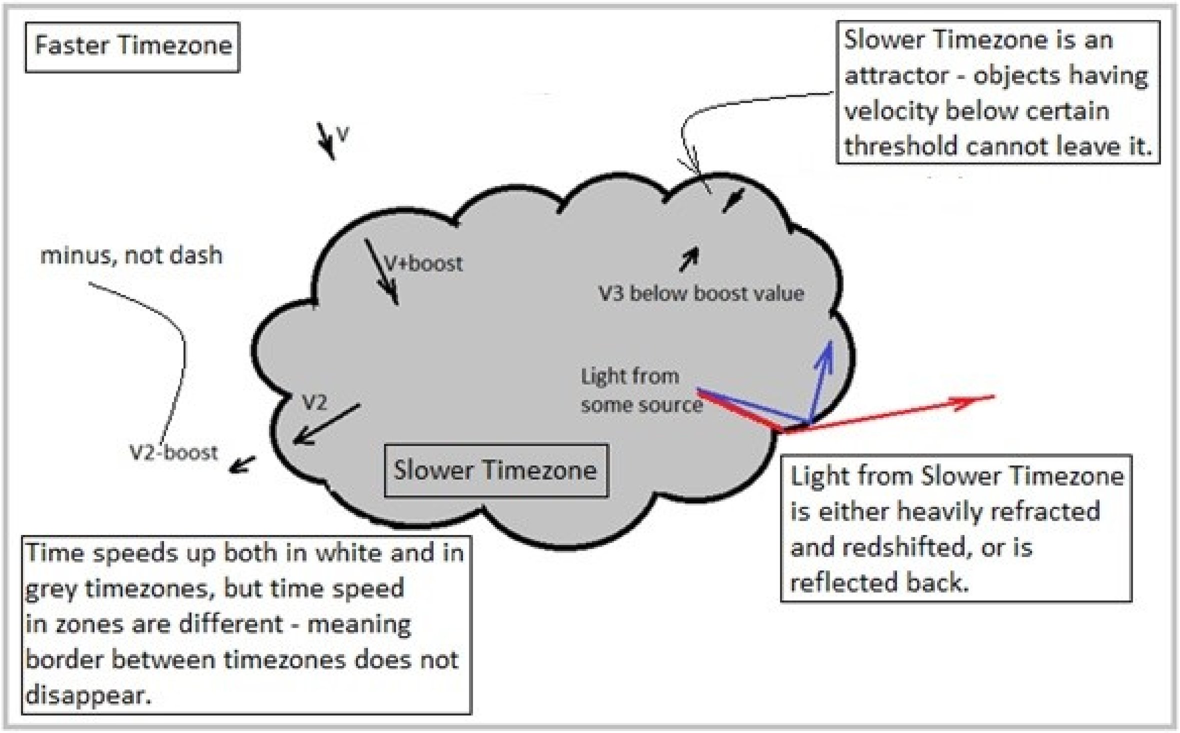
In the next chapter we will look at matter-antimatter production. And just for clarity, next chapter has no dependency on Spacetime energy formula.

5. HOW MATTER IS MADE AND WHERE ANTIMATTER IS

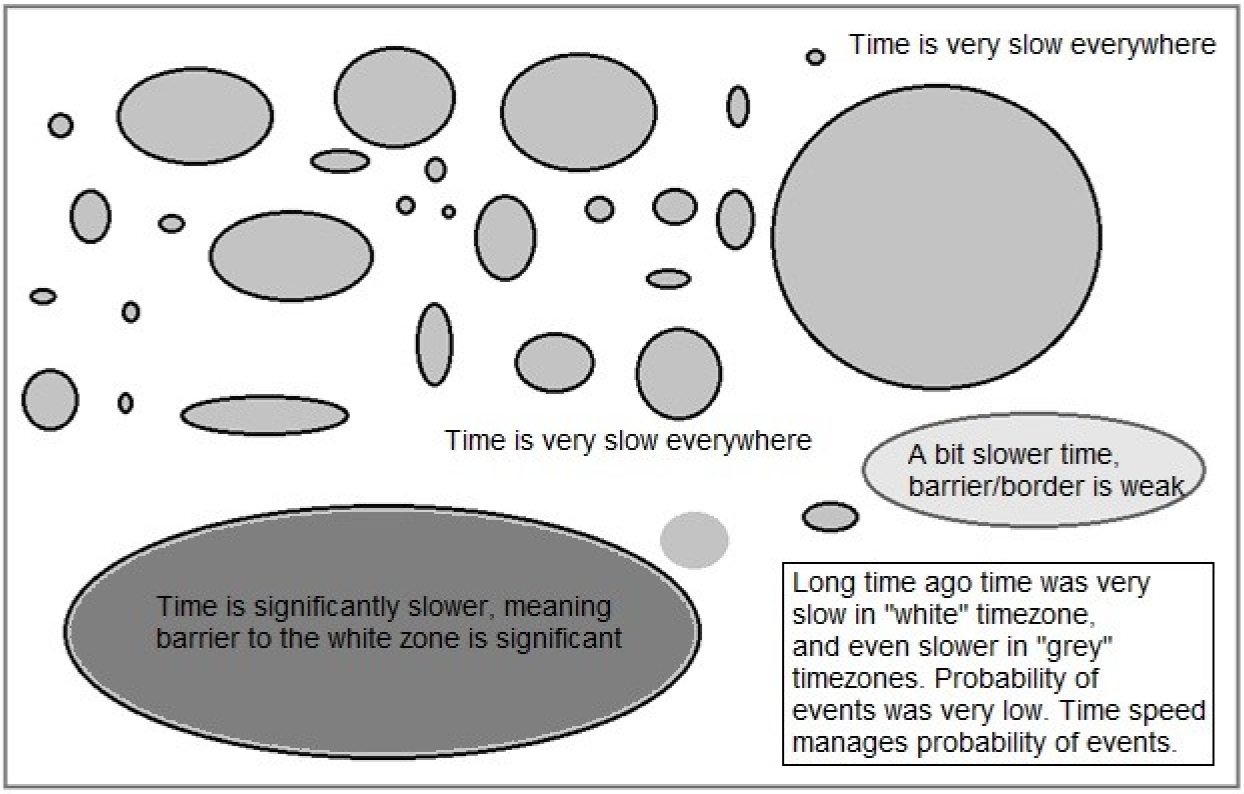
> *"God tirelessly plays dice under laws which he has himself prescribed."*
>
> *Albert Einstein*

I would add on to this: *God plays all tables and at some he wins big*.

Let's summarize what we have learned about time dilation areas in our Universe: they are abundant, vary in size, can vary in "boost" that provides a barrier level, and they can be stealth:


Faster Timezone
V
Slower Timezone is an attractor - objects having velocity below certain threshold cannot leave it.
minus, not dash
V+boost
V3 below boost value
Light from some source
V2
V2-boost
Slower Timezone
Light from Slower Timezone is either heavily refracted and redshifted, or is reflected back.
Time speeds up both in white and in grey timezones, but time speed in zones are different - meaning border between timezones does not disappear.

And we have learned that slower time can switch off some processes and faster time can switch on some processes. And in the past, time was slow, and it speeds up since. Let's go back in time when it was so slow that almost no process could run, and there was no output from any processes – neither matter or antimatter, nor even light. There was space only and mist of time (picture below):


Time is very slow everywhere
Time is very slow everywhere
A bit slower time, barrier/border is weak
Time is significantly slower, meaning barrier to the white zone is significant
Long time ago time was very slow in "white" timezone, and even slower in "grey" timezones. Probability of events was very low. Time speed manages probability of events.

Then at some moment vacuum fluctuations started (actually, they were always there, but happening at lower probability), particles and antiparticles randomly get produced and get annihilated. Even if probability of quantum fluctuation (particle-antiparticle production) is close to zero $P_0 = (1 / \text{Zillion}^{\text{Zillion}})$ per cubic parsec per second. Even for such infinitesimal probability $P_0 = 0.000………………001$ that is still greater than 0:

1) Since Spacetime is infinite both in space and in time, that means probability **P = 1 at any moment for all the space** (because P_0 is multiplied by infinite number cubic parsecs in space), **and P = 1 at any cubic parsec if take enough time** (because P_0 is multiplied by infinite number of seconds).
2) This process is very random, coming with irregularities of time in space, and such irregularities help in two ways:
   - “Positive boost” at the timezone borders helps in pulling particle pair apart

- “Negative boost” (check out what happens with velocity V_3 in the first drawing of this chapter at page 22) helps to collect some stuff in the slower time grey areas

Does not matter how long or how intensive this process was and maybe still is, does not matter that most of real particle pairs annihilated into real photon pairs - sourcing Cosmic Microwave Background, and does not matter that most matter and antimatter annihilated in white common area and in the most of grey areas (see the picture above at page 23). What matters is that in some (let say Zillion) grey bubbles out of all $\text{Zillion}^{\text{Zillion}}$ grey bubbles matter prevailed, and in some of them matter prevailed a lot, and in some other grey bubbles antimatter prevailed. Now God won because he played $\text{Zillion}^{\text{Zillion}}$ tables, and not the only one table like we tried before, in the chapter about Black Holes, where the only table was our Universe.

We find ourselves at one of such matter-won tables – that is our Universe.

Just by looking a single level up, I have succeeded in explaining matter excess in our Universe and where is the antimatter’s asylum. That is enough for the task in hand, but let me take you further to see even bigger grand design, if we need to consider some chain of the processes having dependencies on the outputs of the prior processes. Actually, number of grey bubbles is not $\text{Zillion}^{\text{Zillion}}$ but it is infinite. That means if some process succeeded only at zillionth part of these grey areas, it is still infinite number of grey areas with success – infinity divided by Zillion, meaning in every Zillionth bubble. So, if there is a need to run next process that has a low but still positive probability of success 0.0000…01 and it requires output from some previous processes, still we have infinity of tables with output from the previous processes multiplied by probability 0.0000…01 – that will still give infinite number of tables at which the process will succeed. So, it is doable. Such mechanism can produce almost anything improbable out of whatever improbable.

Now Spacetime looks like Multiverse and there is infinite number of Matter Universes, one of which is our, and infinite number of Antimatter Universes.

What about CMB - Cosmic Microwave Background? Most likely it comes from annihilation, and not from Hydrogen formed in our Universe, because our Universe is finite, and “light from Hydrogen atoms’ formation” left/crossed our Universe long time ago.

Can light travel between Universes? We saw that light is mostly reflected back, and the tiny fraction of light that come out is dissipated over a half of Spacetime and it is redshifted. But answer is yes.

Can object travel between Universes? Most likely it cannot get out of its Universe due to a negative boost, and even if it can, at a timezone border (it has to cross borders twice – his and our) it will be destroyed if boost is relativistic. (In the first chapter, we saw that our Universe had redshift $Z = 11$ in the past. $Z = 11$ can give relativistic boost close to the speed of light $(2Z + Z^2) / (2 + 2Z + Z^2) \times c = 143/145 \times c = 0.986 \times c$. Even for $Z = 1$ boost is $0.6 \times c$).

What is the size of our Universe? Much more than 32 billion light years. Some zeros should be added at the end.

Are there Galaxies farther than 32 billion light years away from us in our Universe? Yes, but we don’t see them yet: some of them already lightened up, but light have not reached us yet; and some of them have not lightened up yet. Remember – long time ago time was very slow, and processes in Spacetime are switched on when time is fast enough.

Are there dark stars and dark galaxies a few billion years from us, or even at closer neighborhood? Yes, and again of two types. They are just not heavy or not dense enough – do not have critical mass to lighten up. Or vice versa – they are too dense or dead (that we discussed in the chapter about Nearly Black Holes). But because time speeds up, they will lighten up at some point of time in the future.

In chapter 35 we’ll show that Plank’s constant was smaller in the early Universe, which lowers energy barriers for some processes, making them probable then, though improbable today.

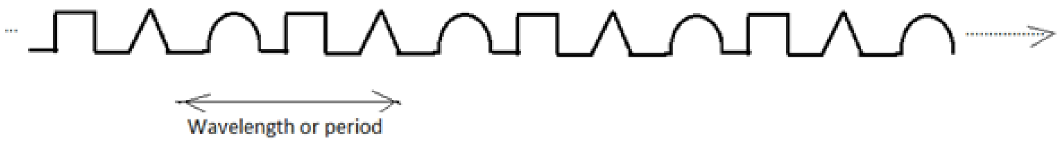
6. MASSLESS NEUTRINO REHABILITATION

Neutrinos get a lot of attention of scientists as the most penetrable particle – neutrinos come from the center of the Sun, and we catch them in telescopes like Ice Cube. Another impressive demonstration of neutrino usefulness – they come from supernova explosion from the center of an exploding star, even before light from this explosion comes to Earth – because light from the center of a star cannot penetrate to its surface, but neutrinos can. We see burst of light from supernova later than burst of neutrinos, because light comes from the surface of the burst when neutrinos are out into the space already.

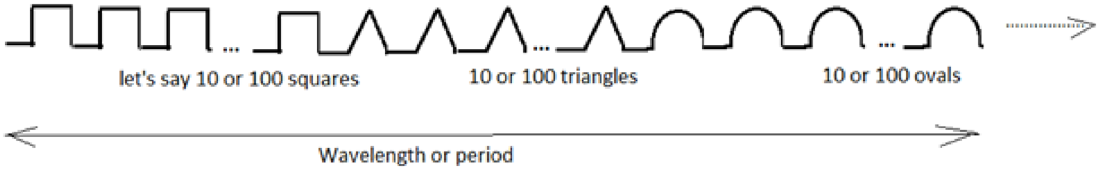
The main puzzle about these particles is their oscillation https://en.wikipedia.org/wiki/Neutrino_oscillation - neutrinos are of 3 types (or have 3 flavors), and while travelling, they change type or flavor many times. “Neutrino oscillation” was interpreted as “experiencing of time by neutrino”, and that led to a very puzzling conclusion that neutrino has time experience and therefore has mass. That contradicts Standard Particles Theory stating they are massless, and it is very doubtful that neutrino has mass: if look again at supernova burst, neutrinos arrived to Earth first, despite huge distance from the burst. Have they had mass, they would have travelled slower than light, at least a bit slower, and on such huge travel distances light would have caught up and arrived to Earth first.

Let’s build massless particles and reproduce neutrino oscillation detection experiments, but for these particles and see them oscillating. Since they are built both massless and oscillating, then statement “oscillating particles experience time and therefore have mass” is invalid. That will put neutrinos where they belong – back to massless group of particles in Standard Model.

Let’s reproduce experiments and measurements and observations with the same result but with particles of photons, so there won’t be any room for suspicion that they carry any mass. Photon is a wave of light, and waves vary in amplitude, wavelength, and phase – such variations are used to build any wave profile for a particle – this method is called “The principle of superposition and the Fourier series”. Let’s build a particle with a wave shaped like this:



or even better, lets make such profile:



Let’s build “flavor 1” detector – it lightens up if at the moment of detection, detector is hit by an oval, “flavor 2” detector – it lightens up if hit by a triangle at the detection point, “flavor 3” detector – it lightens up if hit by a square, and “all flavors detector” or “particle detector” for all of these.

Now let’s reproduce some of neutrino measurements.

1) First paradox came from Sun neutrino measurements: when scientists were measuring “flavor 1” neutrinos coming from Sun, they found 3 times fewer neutrinos than predicted. If we measure a beam of 1000 of our “particles” by “flavor 1” detector, we’ll detect 333 “flavor 1 particles” only. We reproduced the first experiment!
2) Scientists observed that their “flavor 1” detector does not detect neutrinos coming from a nuclear reactor they used for their experiment. But when they put their detector closer to the reactor – they detected “flavor 1”. Besides the obvious reason that number of neutrinos reaching detector goes down with the distance from the source, let’s reproduce such observation. It is easy to do with the second profile of our particle. Let’s redshift it (basically lower energy of a particle) so that its wavelength becomes 100 km. Then two observers: one located at 1 km distance from the source and another at 50 km from the source will detect same particle as of different flavors.

We have reproduced oscillation detection experiments with similar results to the neutrino experiments, but we know for sure that “our particle” is massless – since it was built as a superposition of photons. This invalidates the statement about oscillation proving mass. Standard Model wins!

7. MACROWORLD AND MICROWORLD LINKED?

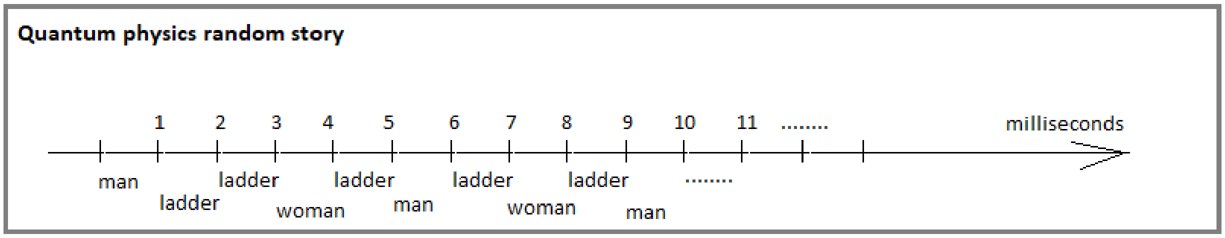
Let’s look at neutrino oscillation from quantum physics perspective.

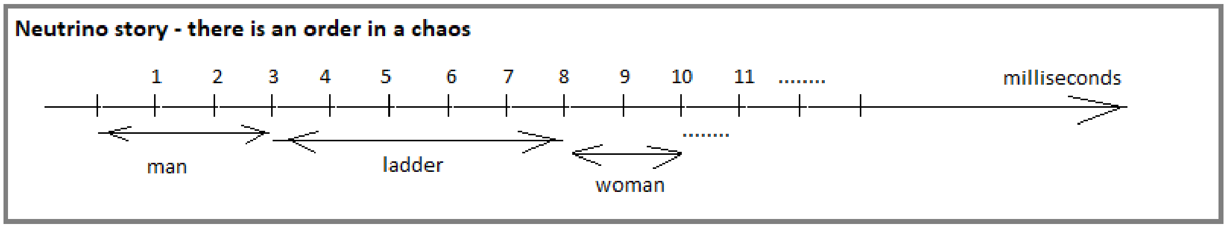
Microworld is described using probabilities, because particle position and other properties cannot be measured exactly, and basically a particle can be at many places at the same time. There is so-called wave function that distributes probability of a particle over the space (or distributes some property of the particle). But when a measurement happens, measurement severely interferes with the particle and changes its wave function. Wave function becomes zero outside of where particle was measured / found. It is said: measurement collapses wave function.

Let’s talk about conditional probability. If you know something about an object, that knowledge might change probability of some property of the object. For example, if you are poor then probability of you driving a Ferrari is close to zero. In quantum mechanics conditional probability of finding a particle in a position “A” when / if we know it was in a position “B” some time ago is still a random function. This conditional randomness might have different distribution than the original randomness. And beware that you cannot measure previous position physically, because after such measurement wave function collapses and the object is not random anymore.

Let me tell you a funny story about an oscillating alien, so you become comfortable with this stuff:

You hired a man and a woman to paint your house and they came with a ladder, a paint brush, and a barrel of paint, etc. The man was holding and moving the ladder and fetching buckets with paint, and the woman was painting your house, and she was on that ladder. But in the evening, you found a posting from “Alien Technologies” telling they do the same job for half price. An alien comes next day, and every 3 out 10 milliseconds he appears as a man, and for every 2 out of 10 milliseconds he appears as a woman, and every 5 of 10 milliseconds he appears as a ladder. And for you, it is not noticeable – you see them all always, you can shake hands with the man and the woman, and talk to them, and even try climbing the ladder – everything feels normal. The only drag you cannot explain, why they do paint job 5 times slower compared to the yesterday's team. Now to the quantum mechanics and what is different with the neutrinos:





Difference between these two observations can be stated probabilistically:

1) Quantum physics cannot predict much on how this alien will appear to us next moment even if we see him as the man at the current moment.
2) Neutrino alien distribution is similar and different. Similarity in:
    - Probability for him to be a man is 3/10
    - Probability to be a ladder is 5/10
    - Probability to be a woman 2/10.

   Difference is in the conditional probability: Probability of him staying the same is quantitatively different. It is because he changes his appearances at the last millisecond of an interval, and not at every millisecond:

    - Probability of him staying a man (meaning when he is a man, then with what probability he still be the man at the next millisecond) is 1-1/3 = 2/3
    - Probability of him being and remaining a ladder is 1-1/5 = 4/5
    - Probability of him staying a woman is 1-1/2 = 1/2

The same applies to neutrino: neutrino retains its flavor for a next second with probability (1 – "infinitesimal"), and if zoom-in an observation interval from a millisecond to even smaller quantum of time, it becomes 1~0 = 1, close to 100%. That is qualitative change – from very random to "very normal" - its behavior is similar to a macro-object: for example - if I’m at home now, then probability of me still being at home next second is close to 1 = 99.99…%.

Basically, observed neutrino oscillation fails Heisenberg uncertainty principle (that comes from same harmonics/Fourier analysis we used to build our particles in the previous chapter) that describes microworld.

Nature and people have zoomed into neutrino experiment so deeply that we have noticed order in disorder. On example of “neutrino alien” – we notice order only when we can zoom into milliseconds – then we see the man only, or the woman only, or the ladder only at a time. But if our eye has only a second resolution (“second” is unit of time) then we see this alien in all his 3 appearances at once always (because he changes appearances 300 times per second).

So microworld when zoomed-in enough behaves like macroworld? That was the message from the neutrino oscillations, right? Please check chapter 28 on microworld being alike to macroworld.

8. ENERGY MEASURES TIME

Formulas below are conceptual and they are in line with the Einsteinian interpretation of energy and time (vs. Newtonian potential and kinetic energy, and static time). Precise formulas check later in chapter 35.

Inertia as time dilation

In “TIME IS THE ENERGY OF SPACETIME” chapter we saw that even vacuum has energy

$$\mathbf{E \sim Second}$$

meaning energy of space is proportional to a unit of time of the place. Let’s rewrite this formula:

$$\mathbf{E = Some\_Constant \times Number\_of\_Seconds \times Second} \qquad \mathbf{(1)}$$

where Some_Constant - a coefficient to match dimensions,

and Number_of_Seconds measures amount in “time units”.

Later we will come to a better understanding of Number_of_Seconds × Second.

Let’s talk about a real object. It consists of some real particles that encapsulate some amount of time within. And formula (1) applies to the object as well, where Number_of_Seconds is time encapsulated. For the object at rest, when velocity is 0

$$\mathbf{E_0 = Some\_Constant \times Number\_of\_Seconds \times Second_0}$$

If speed up this object to a velocity V, then time dilation happens by Einstein’s formula:

$$\mathbf{Second_V = Second_0 / (1 - V^2/C^2)^{1/2}}$$

thus, the energy of the object

$$\mathbf{E_V = Some\_Constant \times Number\_of\_Seconds \times Second_V}$$

increases, because $\mathbf{Second_V > Second_0}$ **:**

$$\mathbf{E_V - E_0 = Some\_Constant \times Number\_of\_Seconds \times (Second_V - Second_0)} \qquad \mathbf{(2)}$$

This positive energy delta = $E_V - E_0$ is the inertia, and it is proportional to the time change inside the object.

Gravity as time dilation

Let's consider the same object when it rests on the ground, and when it is at height **h** from the ground. Its "internal energy" is the same at height **0** and height **h** – by formula (1) where **Second** is attached to an "internal clock". Difference is like in Archimedes principle, where he measured volume of an object as the volume of water displaced by the object submerged. Let say $\mathbf{Second_0}$ is a second of time on the ground, and $\mathbf{Second_h}$ is the second of time at the height **h**. By Einstein's gravitational dilation

$$\mathbf{Second_0 > Second_h}$$

On the surface of Earth, our object displaces amount of time

$$\mathbf{Number\_of\_Seconds \times Second_0}$$

thus, altogether system energy when object is on the ground is

$$\mathbf{E_0 = Some\_Constant \times Number\_of\_Seconds \times (Second - Second_0)}$$

where **Second** is unit of internal time of the object, and $\mathbf{Second_0}$ is unit of space time at the ground level. Similarly, system energy when object is at height **h**:

$$\mathbf{E_h = Some\_Constant \times Number\_of\_Seconds \times (Second - Second_h)}$$

$$\mathbf{E_h - E_0 = Some\_Constant \times Number\_of\_Seconds \times (Second_0 - Second_h)} \quad \mathbf{(3)}$$

This positive energy delta = $E_h - E_0$ is proportional to the time change outside the object.

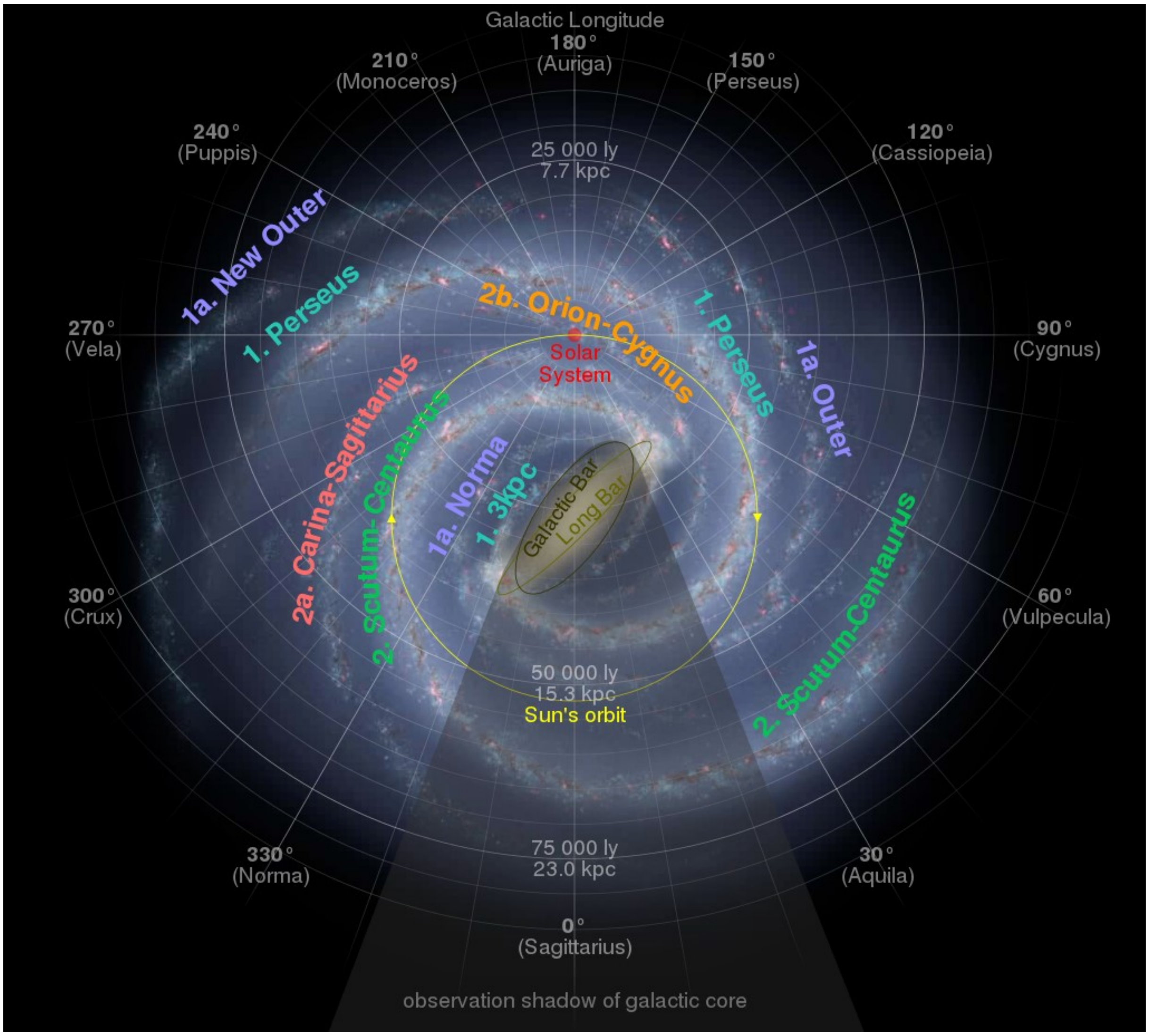
Energy measures time

Formulas (1), (2), and (3) show that energy is just a measurement of time. And Einstein's mass equivalency principle (for time) is similar to Archimedes volume equivalency principle (for space). For more elaboration on this, see chapter 20.

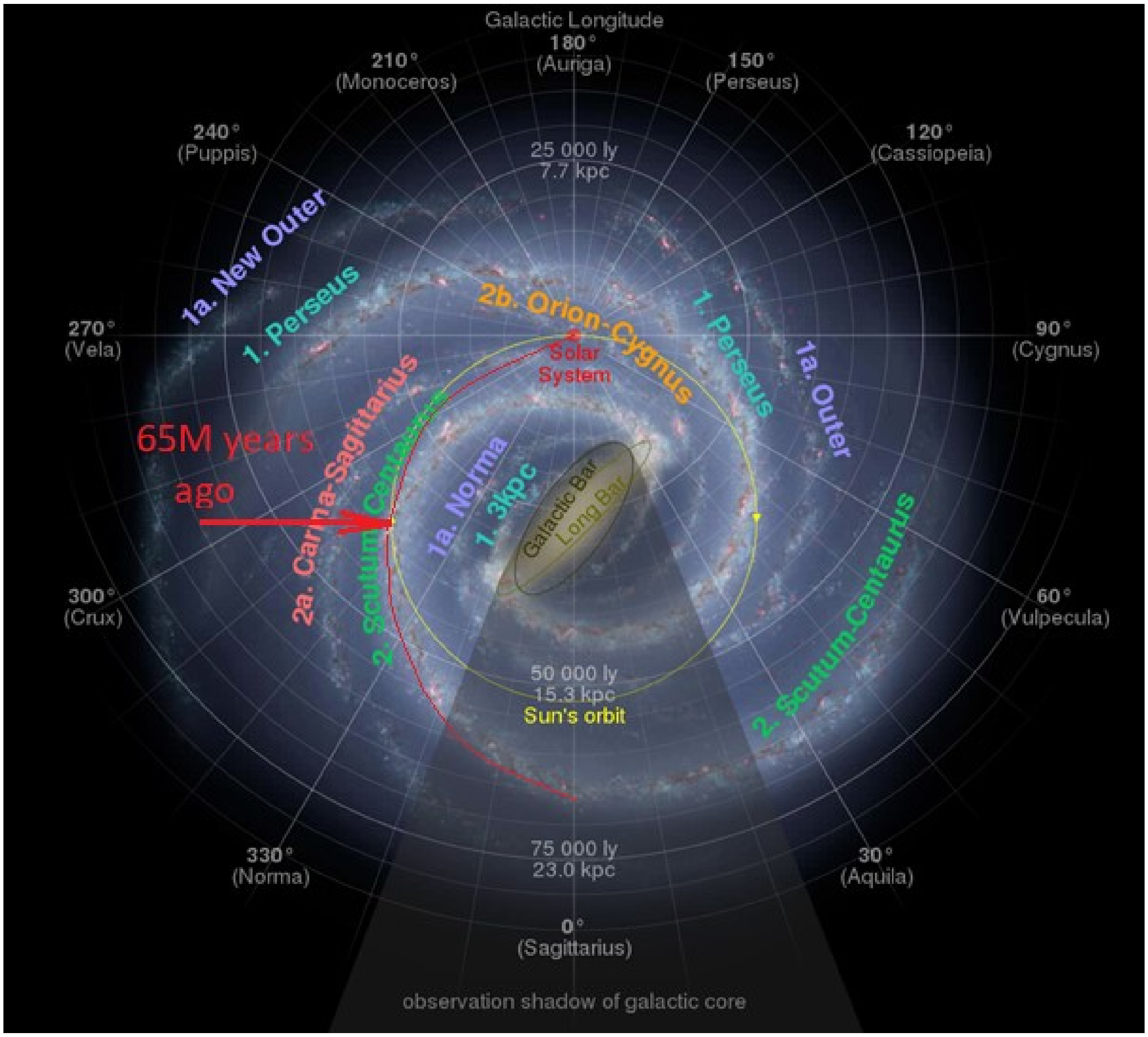
9. WHAT HAPPENED 65 MILLION YEARS AGO?

From https://www.nationalgeographic.com/science/article/what-actually-killed-dinosaurs-volcanoes-heat-up-debate: “Ask someone how the dinosaurs died, and chances are they will tell you about an apocalyptically bad day 66 million years ago, when a huge asteroid slammed into Earth and triggered a nuclear winter. This event left behind distinct traces in the geologic record, as well as a vast crater off Mexico's Yucatán peninsula called Chicxulub. But since the 1980s, researchers have debated whether volcanoes in ancient India may have been an accessory to the mass extinction—or even its main driver… According to the two teams, the massive volcanoes, called the Deccan Traps, started erupting about 400,000 years before the Chicxulub impact and wrapped up about 600,000 years after the end of the Cretaceous period. At least half of the volcanoes' total erupted lava spilled out after the impact… The eruptions could have injected massive amounts of greenhouse gases and particles into the atmosphere, changing Earth's climate in ways that stressed out late Cretaceous life. Then, in a one-two punch, the impact's nuclear winter would have sharply cooled Earth and caused ecosystems to collapse.”

After such a good explanation would be strange to ask “But why this happened and why 65 million years ago?” This strange question has a very precise answer that brings some adjustments to the explanation above. Let’s start from the Wikipedia’s map of Milky Way and our Solar system in it:



Actually, it is incorrect that our Sun has a circular orbit in the galaxy. We have learned that stars lose velocity when they enter an arm and gain velocity on exiting an arm. Let me try plotting approximate Sun latest orbit with the red line below, near the yellow circle that is a good approximation for the latest 65M years:



Sun circular orbit is estimated to have 225M-250M years period (https://earthsky.org/astronomy-essentials/milky-way-rotation/#). We go with more than 250M estimate, considering that real orbit is actually longer than the circular. That gives us a point when Sun left Scutum-Centaurus arm (either by the yellow circular orbit or by the red combination of elliptic orbits) approximately 65M years ago on the map above.

Let’s see how leaving an arm can cause tectonic and volcanic activities and asteroid events on Earth, and the decline in Solar activity.

When Solar system left the arm, it entered slower time zone. Fusion processes and Solar activity slowed down because Hydrogen atoms slowed down their run. Despite fusion (in Sun) and fission (in Earth) chain reactions slowing down due to the time dilation for atom or neutron runs, there is no impact on radioactive decay for a single atom, because internal time of an atom is not impacted.

There are estimates that half of contribution to the Earth tectonic and volcanic activities come from the decay of radiogenic atoms in the Earth.

https://www.nature.com/articles/srep37740.pdf: “The KamLAND Collaboration reported that heat from radioactive decay of radiogenic isotopes such as 238U and 232Th contributes about half, 21 TW, of Earth’s total heat flux (44.2±1.0 TW) and that Earth’s primordial heat supply has not yet been exhausted.”

https://blogs.scientificamerican.com/observations/nuclear-fission-confirmed-as-source-of-more-than-half-of-earths-heat/#: “Earth is chock full of such radioactive elements—primarily uranium, thorium and potassium. Over the billions of years of Earth's existence, the radioactive isotopes have been splitting, releasing energy … That energy heats the surrounding rock and keeps the elemental forces of plate tectonics in motion.”

Now imagine what happens when time on Earth slows down: dissipation of energy into space slows down, but the energy flow from radioactive elements' decay stays same. It leads to heating up the Earth, tectonic activities and volcanic eruptions. That explains how CO_2 production increased (due to the volcanic activities) and how photosynthesis by plants consuming CO_2 and producing oxygen decreased (due to the Solar activity decline). That was the leading cause for big animals’ extinction. Besides that, dinosaurs were big warm-blooded creatures and could not tolerate heated climate either (in comparison to big cold-blooded reptiles, which survived this event).

Asteroids did not help either. Why asteroids are more likely to collide with Earth on exiting or entering an arm? We discussed a similar question in the chapter about spiral galaxies: objects’ trajectories change on entering or exiting an arm. Stars rotating in the same plane avoid collisions by repelling each other by same polarity magnetic fields. But Earth has no such protection: its magnetic field is not that strong and asteroids have none.

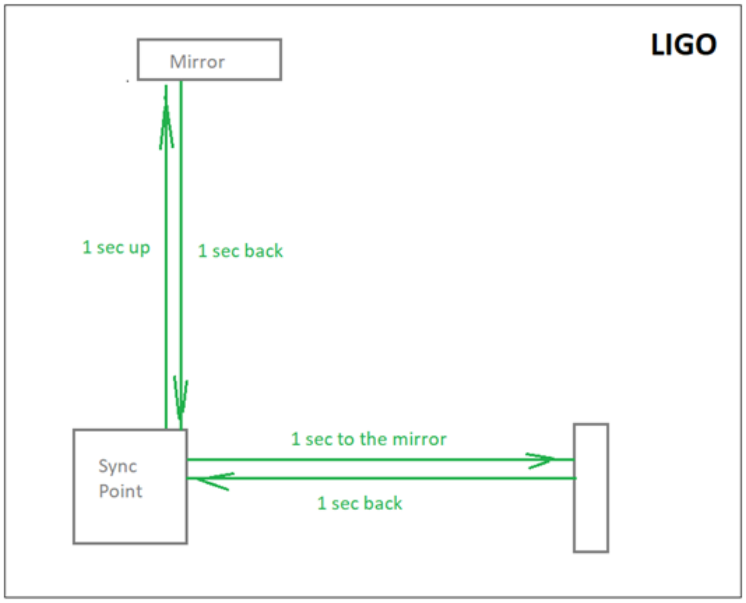
10. GRAVITATIONAL WAVES AND LIGO DEVICE

Gravitational waves story: if some mass moves somewhere, that is sensed everywhere as wobbling of Spacetime. Einstein submitted a paper on such waves, but then he withdrew it - in his own words, it would have led to a singularity. Let me explain his concern using another example first, by separating Spacetime wobbling into space wobbling and Time Dilation. If you remember, in the first chapter of this book, we debunked Big Bang (singularity) that was speculated out of “spatial redshift explanation” (via Doppler effect). Explanation through Time Dilation does not lead to a singularity. Einstein had the similar feeling/concern about spatial part leading to a singularity.

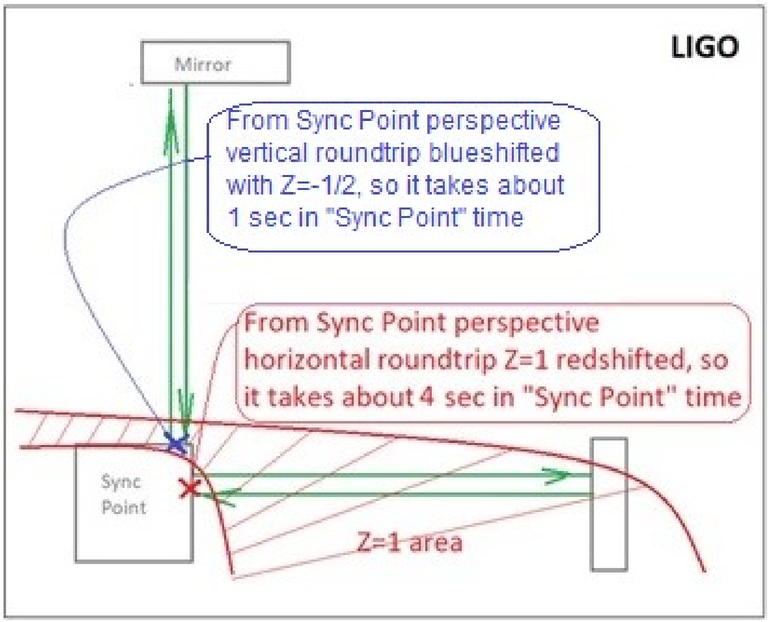
First gravitational waves detection was reported in 2016 when “two black holes merged”. Kip Thorne: “The black holes that LIGO (the device described below) observed created a storm in which the flow of time speeded, then slowed, then speeded. A storm with space bending this way, then that.”

By now readers should know that black holes (singularities) do not exist. There are several proofs of this, but let’s use the simplest from this book: near event horizon Second becomes infinite, and so is energy of Spacetime - that violates energy invariance. Thus, Kip Thorne’s statement could be valid for “nearly black holes” (and other stars) only.

Let’s talk about LIGO device. It is two synchronized lasers perpendicular to each other with mirrors at the ends 4 km apart. Ideally, if no interferences, both laser waves, when reflected back, should be still in sync (have the same phases and wavelengths). Otherwise, gravitational wave is reported (after noise is excluded by comparing with the same time report from another remote LIGO). For the sake of simplicity, let’s draw a simplified LIGO device with 300,000 km (instead of 4km) arms, and let’s assume that speed of light is exactly 300,000 km/sec:



When no gravitational disturbances, for both laser beams' roundtrip is 2 sec. As we know, gravitation is tied to a Second value – which is the same around LIGO device at the moment. Now, again for the simplicity of calculations, let's assume that gravitational disturbance with redshift Z=1 penetrates into LIGO, meaning time slows down twice at the penetration area. And for the simplicity of calculations, let's assume that the penetration area (in red) looks like this:


LIGO
Mirror
From Sync Point perspective vertical roundtrip blueshifted with Z=-1/2, so it takes about 1 sec in "Sync Point" time
From Sync Point perspective horizontal roundtrip Z=1 redshifted, so it takes about 4 sec in "Sync Point" time
Sync Point
Z=1 area

From Sync Point perspective: horizontal beam roundtrip takes ~4sec (when measured at red **x**) and vertical beam roundtrip takes ~1sec (when measured at blue **x**). LIGO will report gravitational wave because of time dilation alone. Neither speed of light, nor distances, nor space changed, despite from the Sync Point of view it may seem that “horizontal distance doubled” and “vertical distance shrank twice”.

It is good to discuss here why speed of light is constant. Speed of light **C (299,792,458 m/sec)** actually means or can be used for the “definition” or “measuring” of a Second – like **Caesium-133 clock (9,192,631,770 oscillations)** is the “definition” or “measuring” of a Second. Either way these “definitions” are equivalent and interchangeable. There is no mystery about speed of light being constant – as it is just a fixed number by the definition, and all volatility goes to a Second value that varies here and there and everywhere.

In this book we have proved that there are no singularities (neither Black Holes nor Big Bang) and since gravitational waves research targets singularities mostly, and since those waves actually are about Time Dilation (for which there are many other sources and reasons) – I suggest adapting LIGO device for the experiment, described in the first chapter, to prove the time is speeding up. If time speeding up is detected, then there was no Big Bang.

11. BURNING TIME IN LABS AND IN GALAXIES

Download from
Dreamstime.com
This watermarked comp image is for previewing purposes only.

https://thumbs.dreamstime.com/z/passage-time-clock-falling-apart-burning-concept-72445393.jpg

Our Sun burns hydrogen into helium, and Sun can burn hydrogen in its core only where hydrogen is dense enough. Some stars burn helium into carbon, carbon into nitrogen, nitrogen into oxygen, … And lots of photons and neutrinos are generated in such burning. In this chapter we'll talk about "time burning into particles" (matter, antimatter, photons). In the middle of this book, we described that long time ago, when time was very dense/slow, time was burning into matter (and antimatter) of which our Universe was made eventually. Apparently, time should be very dense/slow (meaning Spacetime has high energy) to burn into matter easily, otherwise we would have seen it burning everywhere. And it still burns in some areas. Let's recollect where slow time could be found:

- Everywhere - long time ago,

- At the Milky Way center now (because of strong gravitational time dilation),
- Inside energetic particles (because of strong relativistic time dilation).

CMB (Cosmic Microwave Background – isotropic 2mm wavelength radiation) previously was speculated as coming from hydrogen atoms formation following the Big Bang (and the original wavelength was thousand times shorter than 2mm). But since we debunked Big Bang, we can speculate now that it comes from the annihilation of matter and antimatter produced out of time. Wavelength of "annihilation" photons is billion times shorter than 2mm - if it comes from electron-positron annihilation, and it is trillion times shorter than 2mm - if it comes from proton-antiproton reaction (it includes decay of intermediate particles: proton-antiproton annihilation is more complicated than just electron-positron annihilation into a pair of photons). That means redshift Z for the CMB-from-annihilation is in billion-to-trillion range. Thus, time was billion-to-trillion times slower back then. So, particles produced at that time encapsulate time that is billion-to-trillion times more energetic/slower than time is now. Is it even possible for particles to encapsulate such an energetic/slow time? High energy particles are observed in cosmic rays or made in accelerators by speeding up protons or electrons. The most energetic particles obtained/observed:

- Proton at CERN 299,792,455 m/sec
- Electron at CERN 299,792,457.9964 m/sec
- In cosmic rays 299,792,457.999999999999918 m/sec

Let's analyze the winner and calculate what is the relativistic redshift Z for such cosmic ray particle, from a known formula:

$$Z+1 = (1+V/C)^{1/2} / (1-V/C)^{1/2}$$

$$= (1+1)^{1/2} / (1 - 299{,}792{,}457.999999999999918 / 299{,}792{,}458)^{1/2}$$

$$= 2^{1/2} / (82 \times 10^{-15} / (3 \times 10^{8}))^{1/2} = (3/41 \times 10^{23})^{1/2} = 85.5 \times 10^{9}$$

Time in this moving particle is 85.5 billion times slower compared to when this particle was at rest, when time was encapsulated at the particle creation. If we knew what was time density at rest, then we can multiply by 85.5 billion to understand what is time density in that particle now. If assume that such ray was created 32 billion years ago (farthest real observed area), when **rest-time** was 12 times slower compared to today's time (remember farthest timezone with Z=11 in the first chapter?), then the original **rest-time** encapsulated in such particle is 12 times slower than we experience now. We need to multiply our current Second by 12 to get the original **rest-time**'s Second of the particle, and then multiply it by 85.5 billion to get its Second in the cosmic ray.

85.5 billion × 12 = billion-to-trillion

Thus, Second in the cosmic ray is billion-to-trillion times longer than our Second, meaning time in the cosmic ray is billion-to-trillion times slower than the time we live in. This real cosmic ray justifies particle's ability to carry such an energetic/slow time inside.

Now, back to CMB: the hypothetical billion-to-trillion slower/denser time at the matter formation era looks plausible: particles are able to carry such time.

Let's talk about accelerated protons that are used for antiproton generation at CERN and Fermilab. https://en.wikipedia.org/wiki/Antiproton_Decelerator: "Antiprotons are created by impinging a proton beam from the Proton Synchrotron on a metal target (iridium core, which is an extremely hard and dense metal)." At first it looks strange: why an accelerated proton hitting a static target proton produces antiproton instead of producing helium like Sun does? If you ask this question, you will get a quantitative answer: "It is because protons in such accelerators and in Sun are very different in energies". But actually, difference is qualitative, and it is related to the "time burning" directly. Proton acceleration **slows time inside the proton** - people can slow particle's time by accelerating charged particle in strong magnetic field. Now, instead of thinking that we threw near-light-speed proton into the metallic static target, let's think in reverse: **We smashed iridium core at the proton which has slow time inside**. We changed this experiment perspective from:

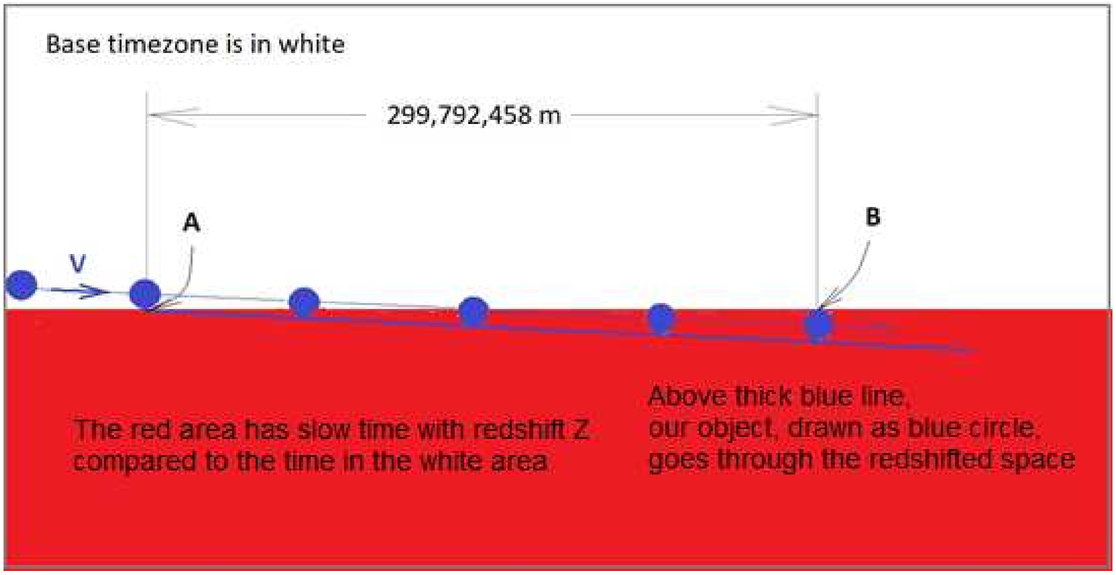
Proton is the bullet and iridium is the target,

and the proton at near speed of light hits the target.

to the reversed perspective where target and bullet change roles:

Iridium is the bullet, and proton is the target, and iridium at near speed of light hits proton that has very slow time inside it. Universe bombards "nearly black holes" (where time crawls slowly) by cosmic rays all the time. But our smart scientists found a "reversed" way in the lab – "target (iridium core) hits a bullet (slow-time proton)". Now we will show that "**Antiproton was produced by burning time - that is what was happening".** It is the main part of the chapter, and the mechanics of it will shed a light on what is going inside Milky Way. And we will understand the iridium choice.

Let's consider general case when some object or some particle crosses timezones:


Base timezone is in white
299,792,458 m
A
B
V
The red area has slow time with redshift Z compared to the time in the white area
Above thick blue line, our object, drawn as blue circle, goes through the redshifted space

Let' consider two cases (I picked some small and big number pairs to ease the calculations):

1) Object velocity V = 0.2×C and red timezone redshift Z = 9
2) Object velocity V = 0.9×C and red timezone redshift Z = 0.2

In either case, there is no problem for the top of the object moving through the white timezone. But we will see the resistance and impossibility for this object moving through the red zone:

1) For V = 0.2×C it takes about 5 sec of white zone time to go from A to B. In red zone, where time is Z+1 = 10 times slower, only 5/10 = 0.5 sec passed for this

move. But distance from A to B in the red zone is the same 299,792,458 m, so our object in red zone moves at 299,792,458 m / 0.5 sec = 2×C - twice the speed of light.

2) For V = 0.9×C it takes about 1 / 0.9 = 1.111 sec of white zone time to reach B. In red zone time is Z+1 = 1.2 times slower, and 1.111 / 1.2 = 0.926 sec passed there. So, object velocity in red zone is 299,792,458 m / 0.926 sec > 299,792,458 m/sec - greater than the speed of light.

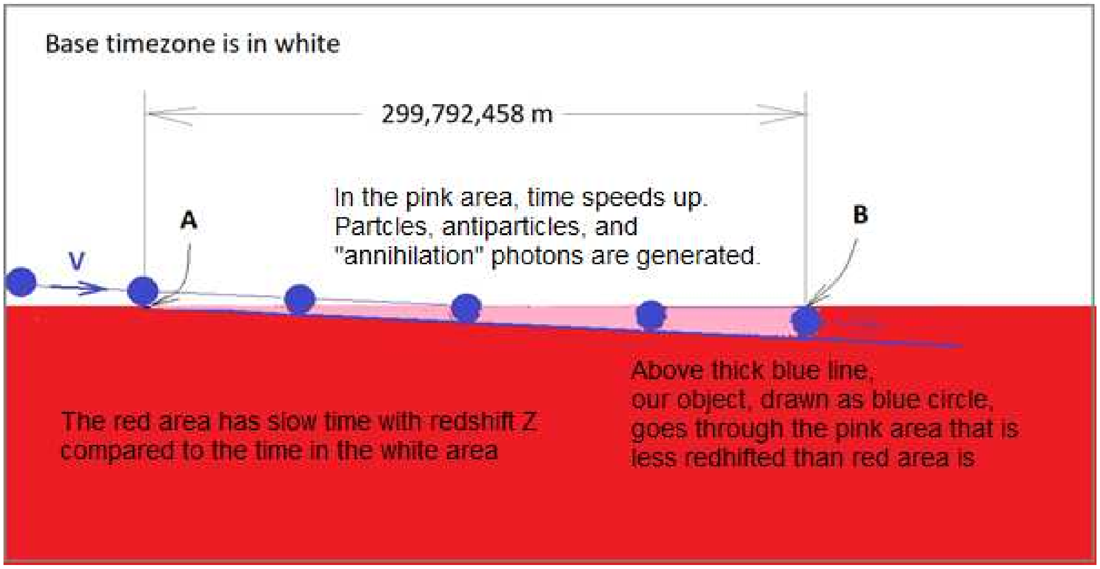
This speed limit violation can be resolved in two ways only. Either object is destroyed when red area is touched; or time speeds up along the object's trajectory - above the thick blue line. There is nothing interesting to learn from the destruction scenario, except that it explains iridium choice: it is very tough material to destroy, and that iridium rod plays the role of an object hitting slow time inside the accelerated proton.

Let's talk about resolving the situation by time speeding up at the object path:

1) For V = 0.2×C let's figure out what redshift X will not violate the light speed limit:

With 5 sec passed at the white zone, 5/(X+1) sec passes at the red zone, thus, 299,792,458 / (5/(X+1)) should not be greater than C = 299,792,458 m/sec. Thus,

299,792,458 / (5/(X+1)) <= 299,792,458 m/sec, X+1 <= 5, X <= 4. And changing redshift from 9 to 4 in the pink area (see the image below) solves the problem:


Base timezone is in white
299,792,458 m
In the pink area, time speeds up.
Partcles, antiparticles, and
"annihilation" photons are generated.
A
B
V
Above thick blue line,
our object, drawn as blue circle,
goes through the pink area that is
less redhifted than red area is
The red area has slow time with redshift Z
compared to the time in the white area

That means time at the pink area loses energy to the particles radiated out. That resembles Cherenkov effect – see below.

1) For the second pair of V and Z, the outcome/solution is the same – time burning in the pink area (the same image above). Time from A to B in the white area takes 1.111 sec. With a new redshift X in the pink area, the same path takes 1.111/(X+1) sec of the pink area time. Thus, to travel a distance of 299,792,458m we need at least 1 sec, so X+1 <= 1.111 solves the problem. Redshift change from 0.2 to 0.111 abides the speed limitation.

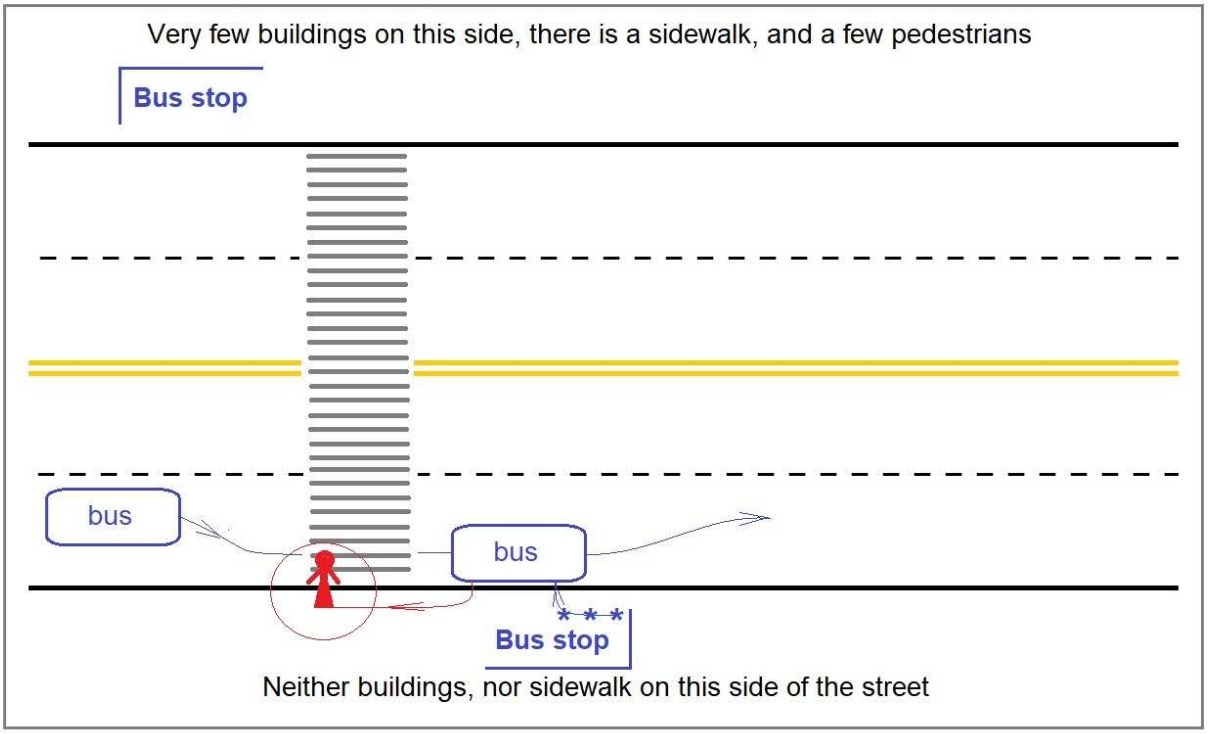
In a way, it reminds of Cherenkov's effect for a charged particle travelling in water with a speed faster than "speed of light inside the water" (which is around 26,000,000 m/sec << C): blue light is radiated from this particle until the particle slows down to the "speed of light in the water" or even below. In our case, such Cherenkov-like radiation consists of particles, antiparticles and high energy photons. And time at the path is partially burnt "from red to pink" - to a redshift value that allows such movement.

We have understood why antiproton is generated from an accelerated proton and the iridium target: through "time burning". Now we can apply this knowledge to what is going on inside Milky Way and in other spiral galaxies. In the second chapter, we discussed time in spiral arms running faster than in the gray areas between the arms. Based on Vera Rubin's data, the grey areas are redshifted at about Z~0.001 (exact value varies by galaxies) in comparison to the arms. In the second chapter we used Doppler effect analogy to figure out velocity boosted on stars leaving an arm. But now, we can redo it simpler using the energy invariance principle: when a star moves from an arm to a grey area – from faster time to slower time – the energy of the system goes down (see the second part of "Energy measures time" chapter), so the speed of the star should go up (see the first part of "Energy measures time" chapter) to compensate the energy loss. **Now, why arms exist at all?** Those arms are streams of burnt-out time (Second is shorter, energy is less there) from inside the galaxy center (bar or disk). Burn-out rate is moderate (Z~0.001 means 0.1% rate). In the center of the galaxy gravitational time dilation is very strong, and on top of that dilation, there are massive stars in the galaxy’s center (“nearly black holes”), so dilation around them is even stronger. Thus, particles and objects hitting such areas “burn time” on their passage exactly as it was described for the “pink area” above. Particles, antiparticles and a lot of “annihilation” photons are produced there. But because galaxy center has strong time dilation, produced radiation is redshifted to us, and energies/frequencies observed seem lower. Charged antiparticles that avoided collisions/annihilation at the galaxy center are thrown out from the galactic plane into the galactic bulge by the strong magnetic field of the galaxy, and they annihilate in the bulge and give out radiation. All that explains energetic and random radiation in the galaxy center, and where spiral arms of burned-out time come from – they are the exhausts/chimneys of the galaxy.

And if you remember chapter 5 about early days of Spacetime, when our Universe was getting matter - same reasoning could be applied there: when particles from a faster time area enter slower time areas (which I drew as grey bubbles, see the second picture in chapter 5 at page 23) that can cause particles-antiparticles-photons bursts and time burning, if the particle violates local speed limit.

12. AN ACCIDENT PROMPTED THIS RESEARCH

In 1980 in a deserted suburb of Moscow where new Olympic Village was built, a few weeks before Olympics opening (so almost nobody was in the village yet, except for the Russian team and a few services), I and two other guys were at a bus stop. It was a brand-new bus line, the only bus line on this road – everybody boards when a bus arrives.


Very few buildings on this side, there is a sidewalk, and a few pedestrians
Bus stop
bus
bus
* * *
Bus stop
Neither buildings, nor sidewalk on this side of the street

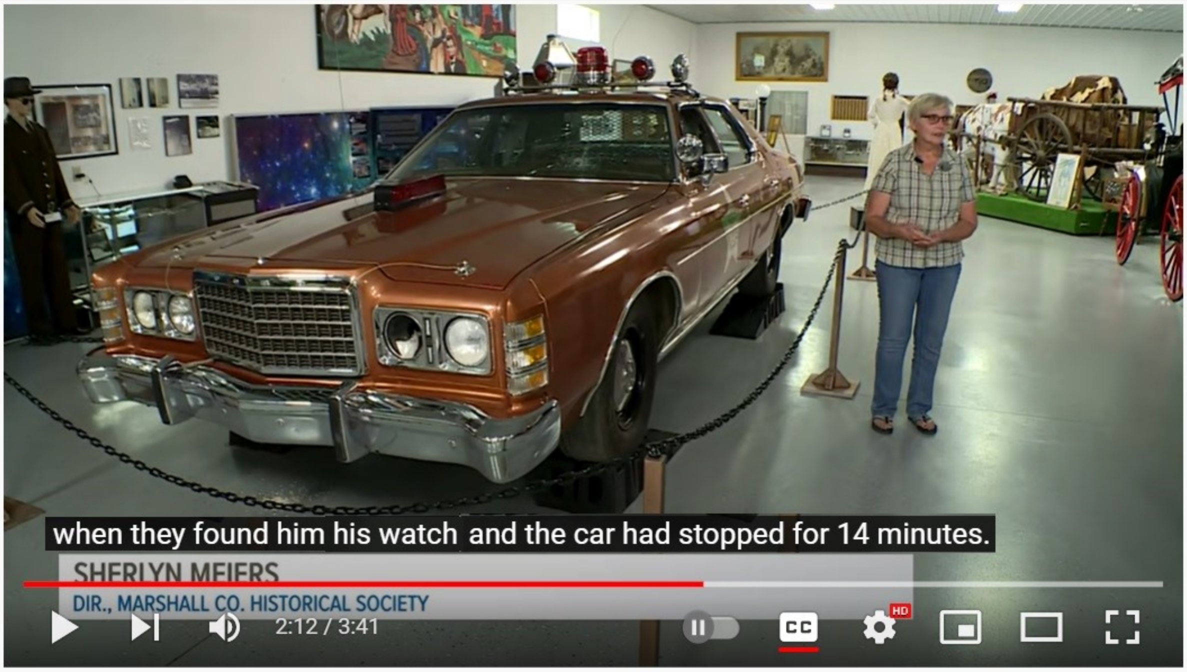
I was the first who came to the bus stop, and I did not see the previous bus leaving. Then two more guys came, and we waited for a bus approximately 10 minutes. We saw nobody else around on our side of the road. Then we saw our bus approaching, dropping its speed, and it hit a woman that appeared from nowhere unexpectedly. She appeared with a foot still on the sidewalk curb, but her body was already over the crosswalk. Luckily the bus had slowed down by then, and the driver stopped it immediately, and did not run over the woman. We rushed to her, with the driver screaming “Where did you come from!?” She sat down and said “I’ll go home”, but we laid her down comfortably and the driver called for an ambulance by the radio. His bus was new, but now it had a significant dent at the right front.

There are many YouTube mocumentaries and animations on this subject. But I was at the accident, and I touched the bus and the woman. And the driver and two other guys stated the same: they did not see the woman until she was hit. And the woman was in shock from the hit, but not confused.

That accident made me curious about space and time. I started looking for a clue that could solve this puzzle. Eventually, I learned that spatial explanations often lead to singularities (that's bad). Spatial explanation for this woman appearance would be "teleportation", which does not survive my critique. But a solution based on Time Dilation seems plausible:

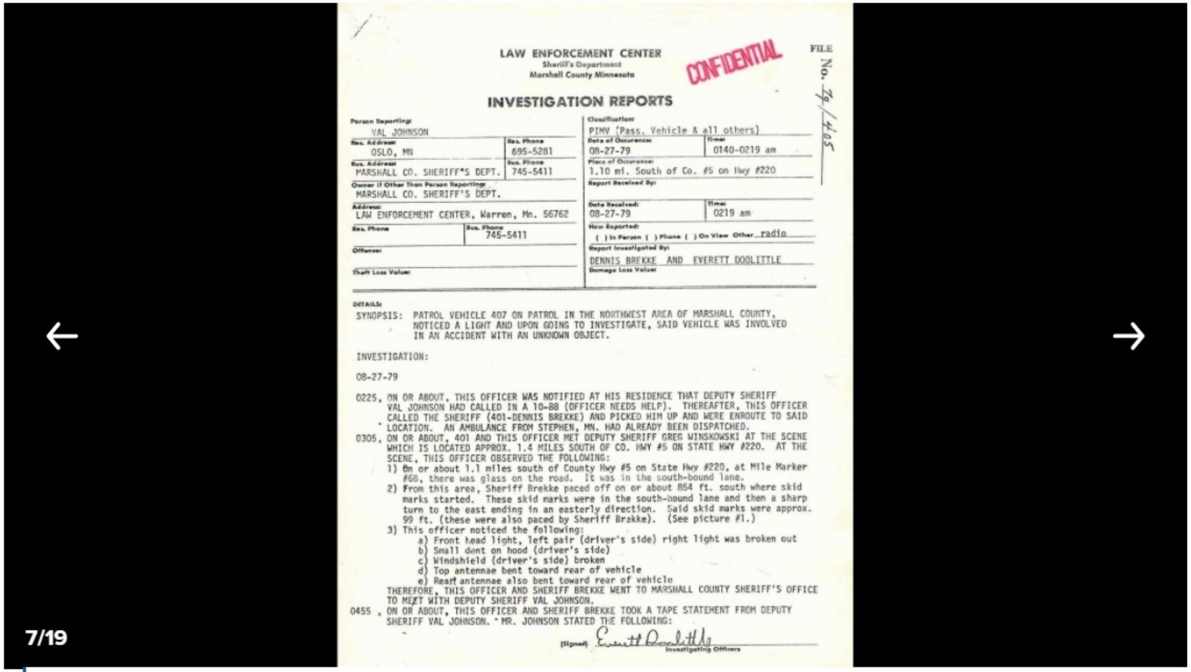
The woman arrived with the previous bus. She approached the crosswalk. At this moment, around her (red circle area in the drawing) Time Dilation happened (a physicist would say "a gravitational wave arrived"), let's say with Z=1000. We previously discussed that a big redshift Z-value causes strong refractions and makes the inside area stealth/invisible to an external observer. For 1 second of woman's time, 1001 seconds (16.7 minutes) passes for an external observer – for me or any guy at the stop. When our bus approached, let's say 15 min after the previous bus left, for the woman less than 1 second passed, she hardly made her first step to the crosswalk, and for her, other people movements around the bus stop were too fast to notice (from her perspective, everything outside the red circle was moving thousand times faster – hard to notice and to understand in less than 1 second). The approaching bus knocked her out of the red circle into our time – so we saw her only then.

Though this solution is incomplete, it is a good start. And it is based on Time Dilation, which has been successfully applied to solve various problems in this book. In this accident we had no material evidence for time dilation. But recently I came across a well-documented accident that happened in Minnesota in 1979, where Sheriff's Deputy's car clock and his wrist watch showed 14 minutes time dilation – meaning he was inside a time bubble. Details are at https://youtu.be/Gss_sbU-Ypc?t=129 :


when they found him his watch and the car had stopped for 14 minutes.
SHERLYN MEIERS
DIR., MARSHALL CO. HISTORICAL SOCIETY
2:12 / 3:41
CC
HD

Minnesota’s most notorious UFO sighting remains a mystery four decades later

Investigative documents are provided by the Marshall Co. Historical Society:



LAW ENFORCEMENT CENTER
Sheriff's Department
Marshall County Minnesota

CONFIDENTIAL

FILE No. 79/405

INVESTIGATION REPORTS

Person Reporting: VAL JOHNSON
Res. Address: OSLO, MN
Res. Phone: 695-5281
Bus. Address: MARSHALL CO. SHERIFF'S DEPT.
Bus. Phone: 745-5411
Owner if Other Than Person Reporting: MARSHALL CO. SHERIFF'S DEPT.
Address: LAW ENFORCEMENT CENTER, Warren, Mn. 56762
Res. Phone:
Bus. Phone: 745-5411
Offense:
Theft Loss Value:
Classification: PIMV (Pass. Vehicle & all others)
Date of Occurrence: 08-27-79
Time: 0140-0219 am
Place of Occurrence: 1.10 mi. South of Co. #5 on Hwy #220
Report Received By:
Date Received: 08-27-79
Time: 0219 am
How Reported: ( ) In Person ( ) Phone ( ) On View Other radio
Report Investigated By: DENNIS BREKKE AND EVERETT DOOLITTLE
Damage Loss Value:

DETAILS:

SYNOPSIS: PATROL VEHICLE 407 ON PATROL IN THE NORTHWEST AREA OF MARSHALL COUNTY, NOTICED A LIGHT AND UPON GOING TO INVESTIGATE, SAID VEHICLE WAS INVOLVED IN AN ACCIDENT WITH AN UNKNOWN OBJECT.

INVESTIGATION:

08-27-79

0225, ON OR ABOUT, THIS OFFICER WAS NOTIFIED AT HIS RESIDENCE THAT DEPUTY SHERIFF VAL JOHNSON HAD CALLED IN A 10-88 (OFFICER NEEDS HELP). THEREAFTER, THIS OFFICER CALLED THE SHERIFF (401-DENNIS BREKKE) AND PICKED HIM UP AND WERE ENROUTE TO SAID LOCATION. AN AMBULANCE FROM STEPHEN, MN. HAD ALREADY BEEN DISPATCHED.

0305, ON OR ABOUT, 401 AND THIS OFFICER MET DEPUTY SHERIFF GREG WINSKOWSKI AT THE SCENE WHICH IS LOCATED APPROX. 1.4 MILES SOUTH OF CO. HWY #5 ON STATE HWY #220. AT THE SCENE, THIS OFFICER OBSERVED THE FOLLOWING:

1) On or about 1.1 miles south of County Hwy #5 on State Hwy #220, at Mile Marker #68, there was glass on the road. It was in the south-bound lane.
2) From this area, Sheriff Brekke paced off on or about 854 ft. south where skid marks started. These skid marks were in the south-bound lane and then a sharp turn to the east ending in an easterly direction. Said skid marks were approx. 99 ft. (these were also paced by Sheriff Brekke). (See picture #1.)
3) This officer noticed the following:
    a) Front head light, left pair (driver's side) right light was broken out
    b) Small dent on hood (driver's side)
    c) Windshield (driver's side) broken
    d) Top antennae bent toward rear of vehicle
    e) Rear antennae also bent toward rear of vehicle

THEREFORE, THIS OFFICER AND SHERIFF BREKKE WENT TO MARSHALL COUNTY SHERIFF'S OFFICE TO MEET WITH DEPUTY SHERIFF VAL JOHNSON.

0455 , ON OR ABOUT, THIS OFFICER AND SHERIFF BREKKE TOOK A TAPE STATEMENT FROM DEPUTY SHERIFF VAL JOHNSON. MR. JOHNSON STATED THE FOLLOWING:

(Signed) Everett Doolittle
Investigating Officers

Credit: Marshall Co. Historical Society

A series of documents provided by the Marshall Co. Historical Society detail the investigation following Deputy Val Johnson's UFO encounter near Warren, Minn. in 1979.

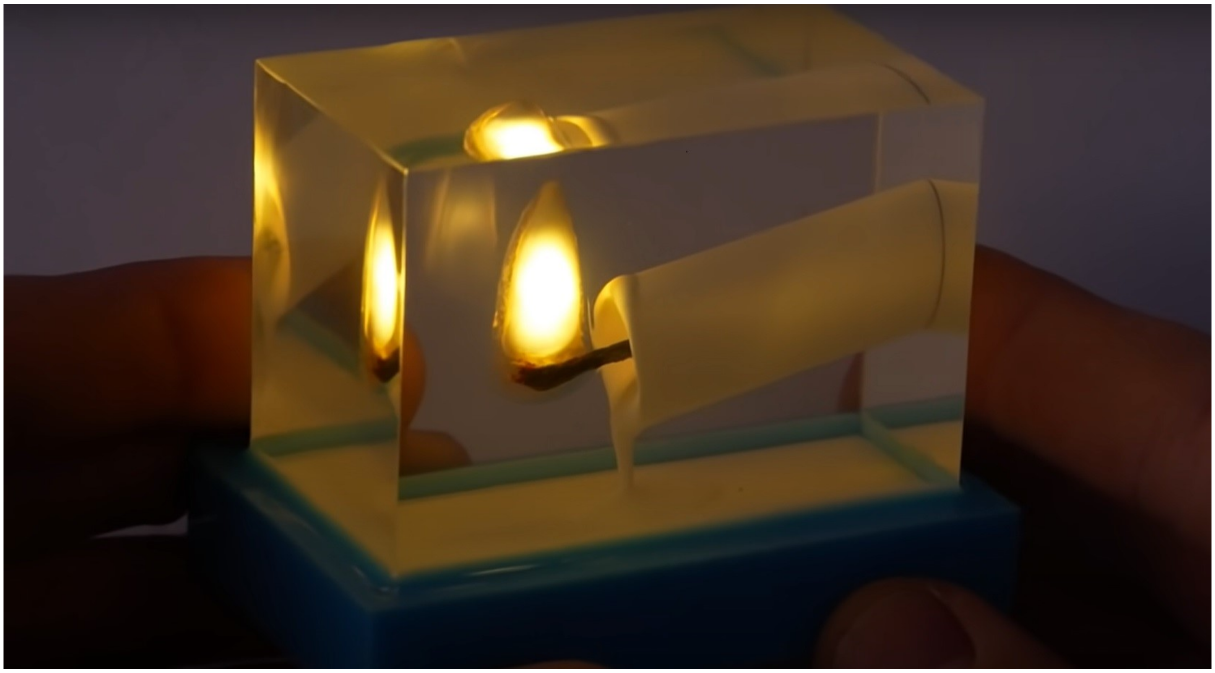
Minnesota’s case is an inside-time-bubble view, and my story is an outside-time-bubble view for the same type of events. Comparing these two cases, most likely Sheriff’s Deputy’s car hit something normal (like the bus hit the woman when she was inside a time bubble). And we discussed that time dilation area acts like lens (similar to magnifying glass). And light coming from outside of slow time area is blueshifted inside the area, and visible or infrared light outside becomes UV light inside. That might explain Sheriff’s Deputy burns on skin and eyes doctors found. Such injuries are common in arc welders exposed to UV radiation.

13. BOB LAZAR: FROZEN CANDLE

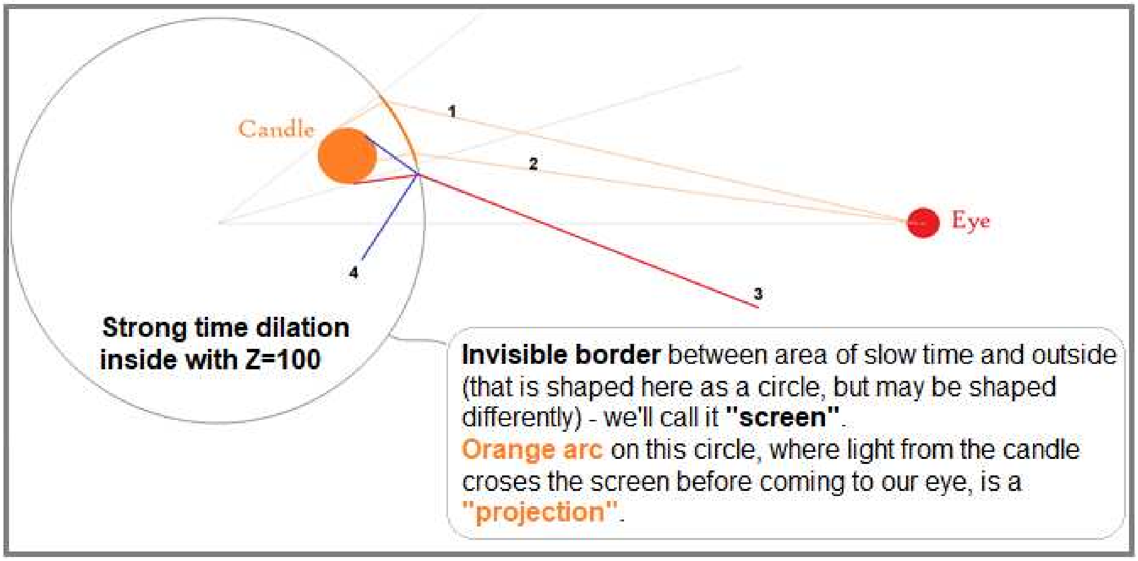
Bob Lazar and the Area 51 Mystery - with George Knapp
EXOMAGAZIN.TV
Footage courtesy of George Knapp
1:05:20 / 1:19:10

https://www.youtube.com/watch?v=HyUlaZR0PoY&t=3800s

Bob tells a story about how they lit a candle and when they pointed the reactor output on it – candle flame remained luminous and stopped moving.



something like that



Invisible border between area of slow time and outside (that is shaped here as a circle, but may be shaped differently) - we'll call it **"screen"**.
Orange arc on this circle, where light from the candle croses the screen before coming to our eye, is a **"projection"**.

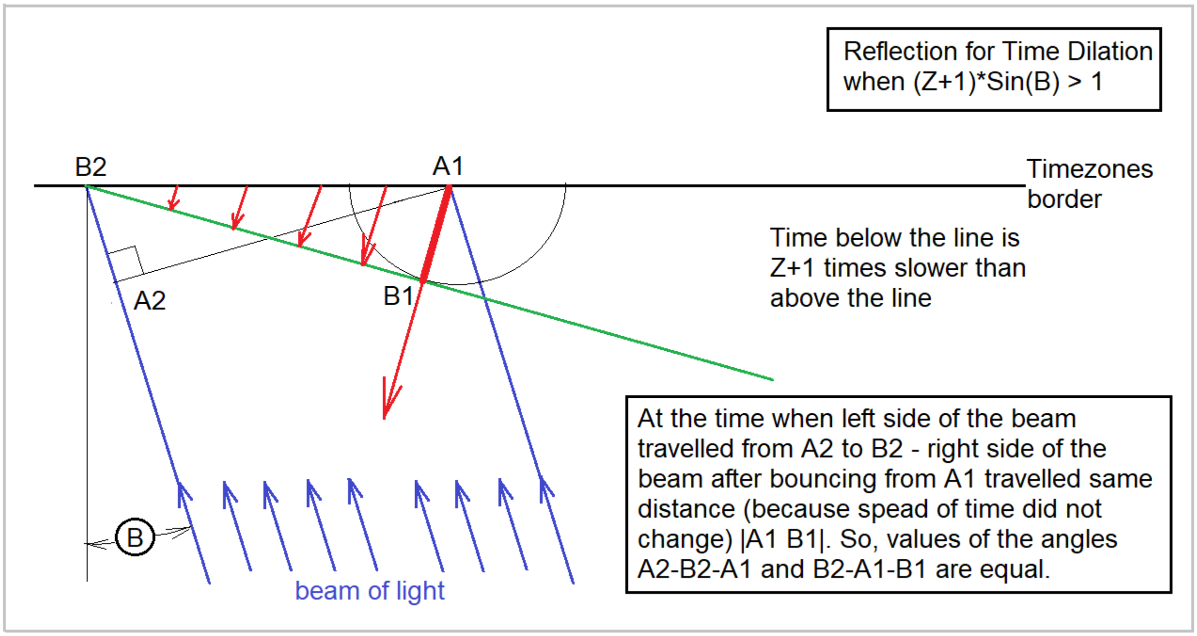
Bob described that the time slowed down at the area where they put the candle. The rate of slowing down (see chapter 1) is expressed in (Z+1), where Z called redshift. Let's say it slowed down 101 times (could be any, should be measured at the site). So, if Bob stood right next to the candle, both for him and the candle, the time slowed down 101 times, so he would not notice anything weird about the candle flame, because time flow is the same for him and the candle. But when he stood outside, for 1 second passed inside the circle – 101 sec > 1 min passed for him. That is why candle flame does not flicker from his perspective – watching the candle is like watching video at a hundred times slower speed. But the most puzzling in this story, both for him and for myself (look at chapter 12 to see why), was that he could see the candle. Our expectation was - it should be screened from us, turned out it is not true, or to be exact – not always true.

By now you should be familiar with Snell's refraction from page 6

$$\mathrm{Sin}(R) = (1+Z)\times\mathrm{Sin}(B)$$

Let's notice that for a large number Z, 100 for example, if angle B is not close to 0, for example B > 1° (B of 0°-90° range), (1+Z)×Sin(B) will become greater than 1 – and that cannot be, because on other side it is Sin(R). Only light that is almost perpendicular to the timezones border can cross it. What happens to the light that reaches the border at the angle far from a perpendicular – it bounces back = reflects.

And reflection law states that light bounces back symmetrically under the same angle, here is proof:

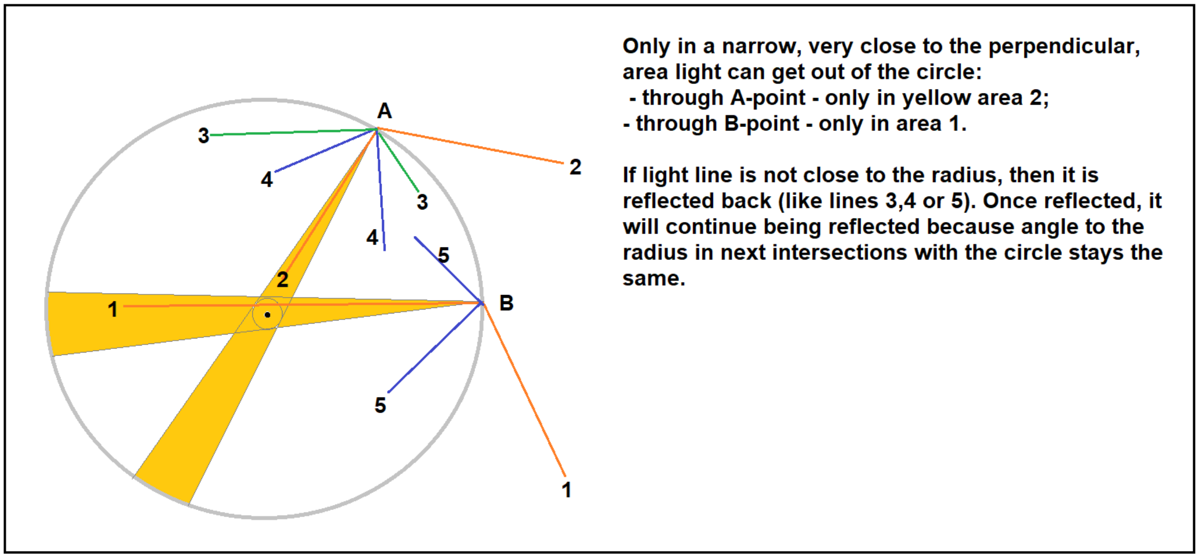


Reflection for Time Dilation
when (Z+1)*Sin(B) > 1

Time below the line is Z+1 times slower than above the line

At the time when left side of the beam travelled from A2 to B2 - right side of the beam after bouncing from A1 travelled same distance (because spead of time did not change) |A1 B1|. So, values of the angles A2-B2-A1 and B2-A1-B1 are equal.

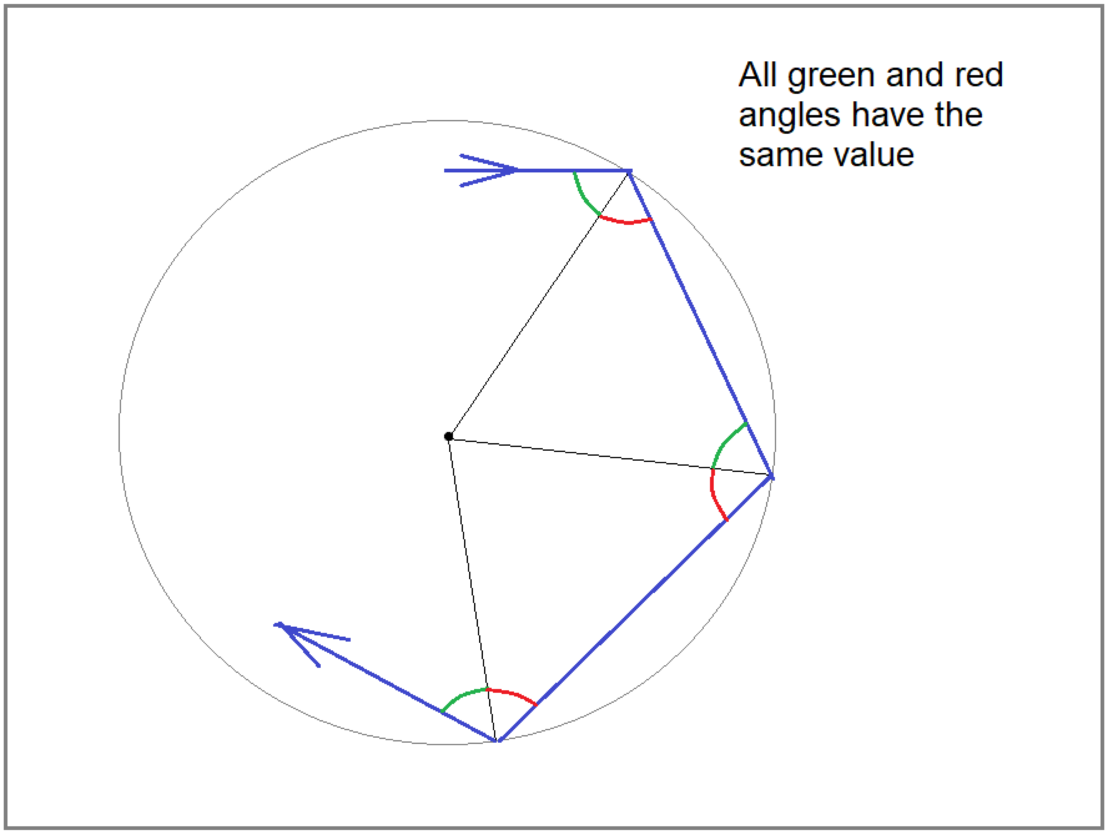
For the light inside circle



Only in a narrow, very close to the perpendicular, area light can get out of the circle:
- through A-point - only in yellow area 2;
- through B-point - only in area 1.

If light line is not close to the radius, then it is reflected back (like lines 3,4 or 5). Once reflected, it will continue being reflected because angle to the radius in next intersections with the circle stays the same.

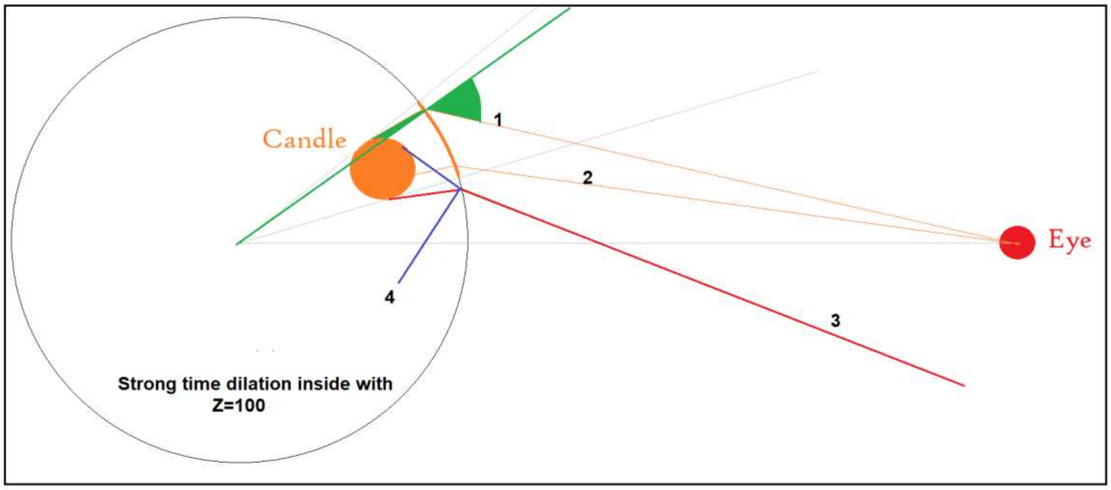
only very close to a radius (that is always perpendicular to the circle) light can get out. And the light that is reflected back, will continue reflecting again and again, because of the property of the circle – angle to the radius remains same:

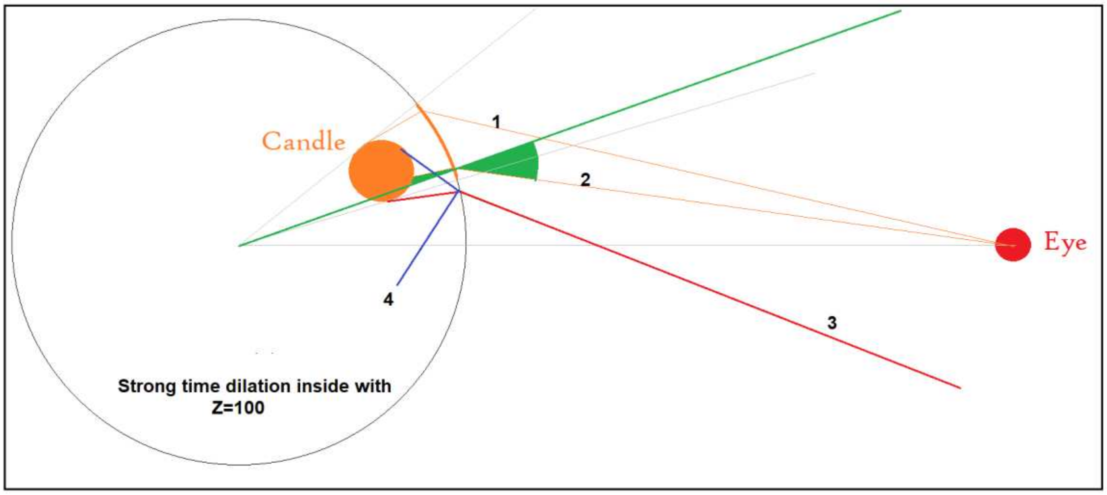


Now, regarding visibility of the candle we will have several cases.

Visible

We can see the candle on the “screen” where it is marked in orange:



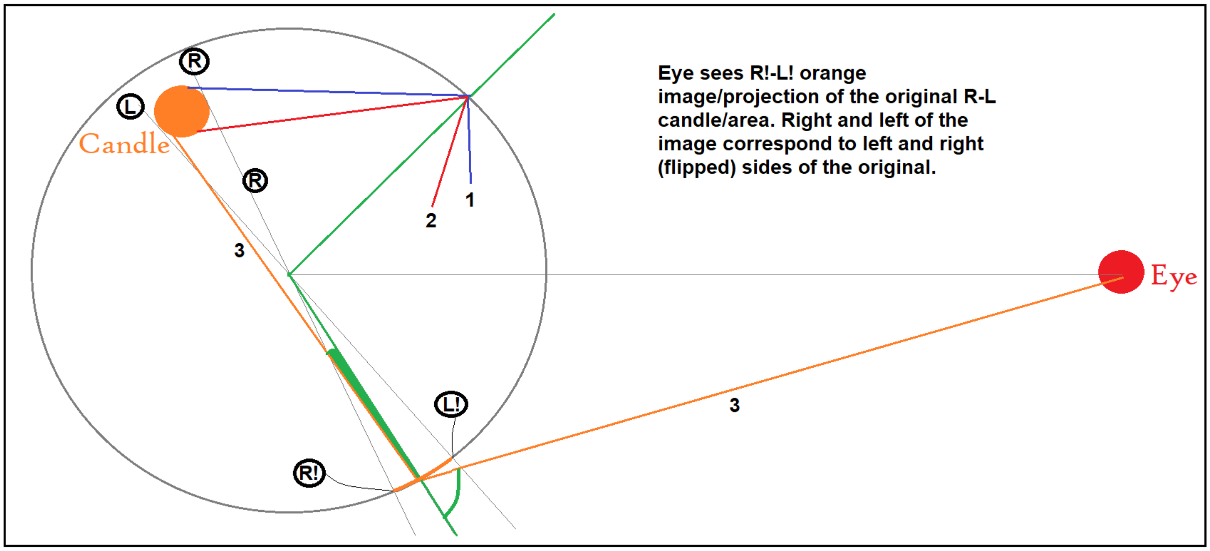


Strong time dilation inside with Z=100

In this position of the candle and the observer candle flame is visible on the screen, and its image is a bit enlarged and a bit shifted.

Mirrored

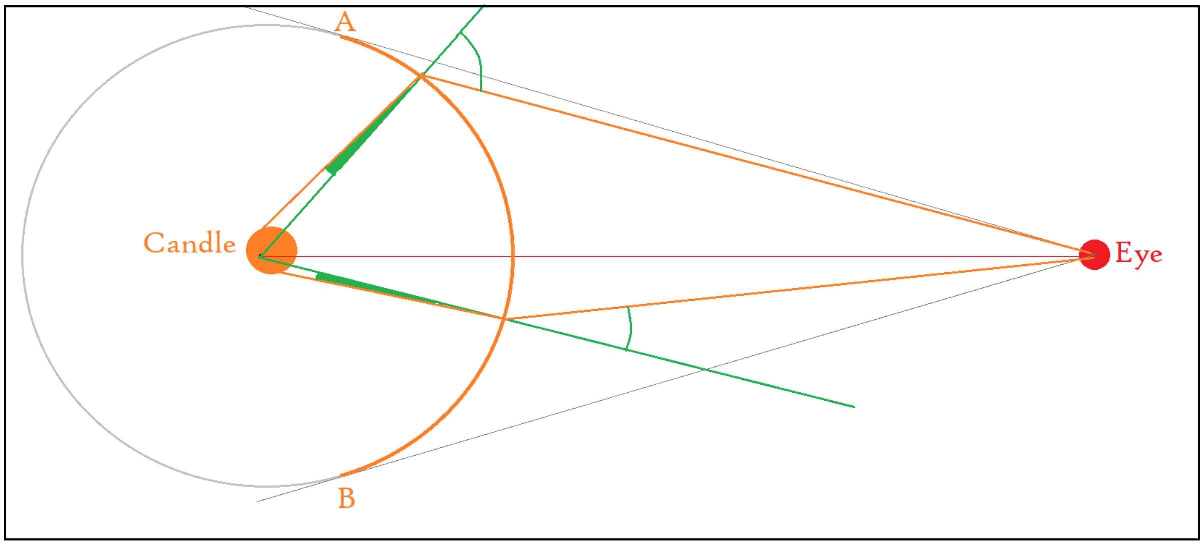
There are positions at which the candle is still visible, but its image is flipped and is seen faraway from the actual position:



Eye sees R!-L! orange image/projection of the original R-L candle/area. Right and left of the image correspond to left and right (flipped) sides of the original.

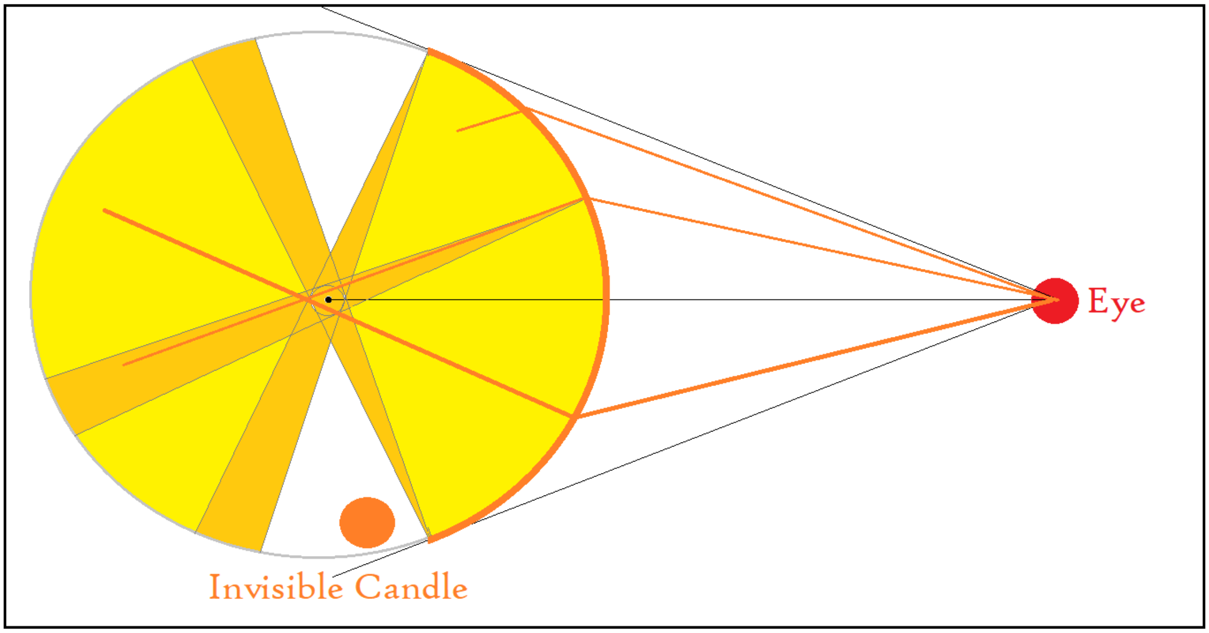
Glowing screen

If the center of the screen is inside the candle flame – we won't see the candle, but we'll see a glowing sphere. Luminosity will be low compared to the candle luminosity – because light is dissipated over the screen – the orange arc is huge:

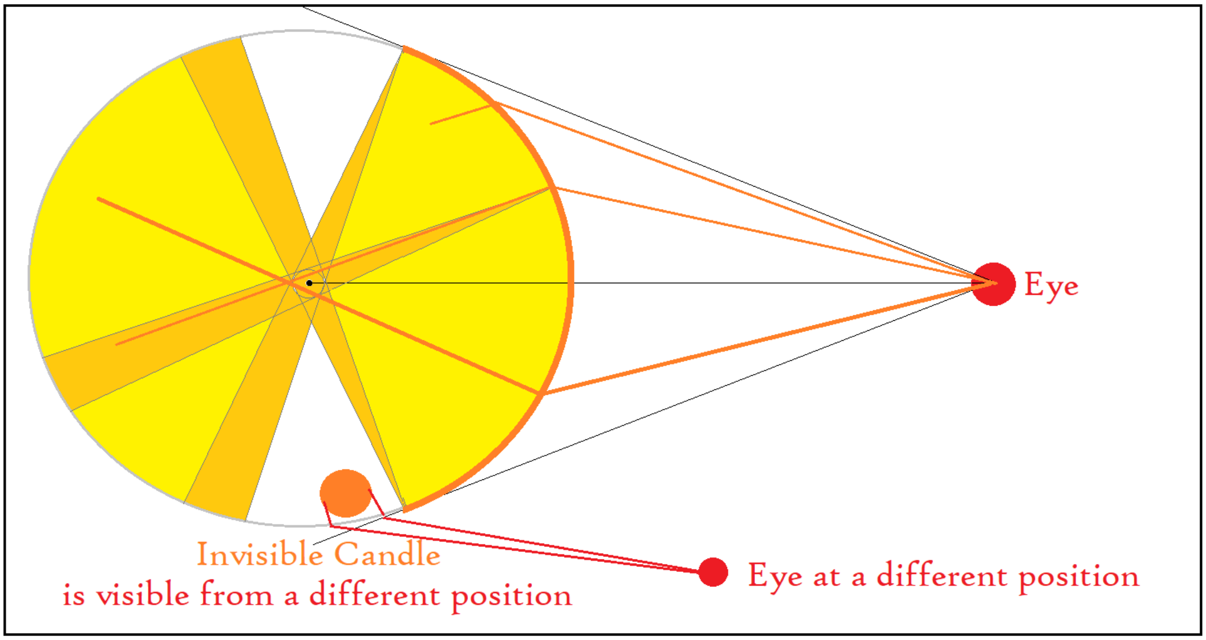


Invisible

And there are two areas of invisibility in white:



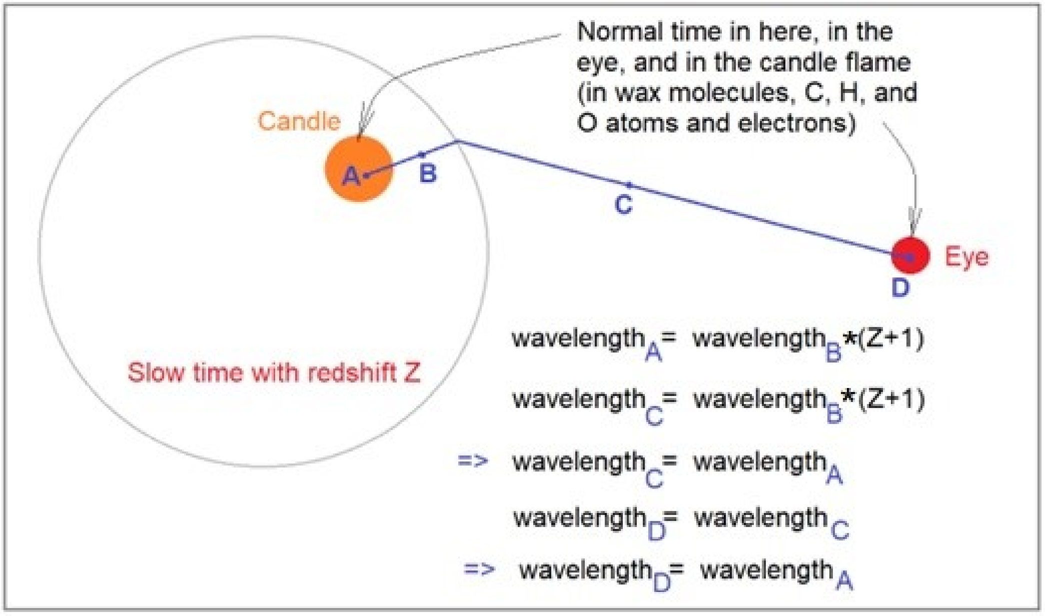
But in still can be seen at a different angle – from another position:


Eye
Invisible Candle
is visible from a different position
Eye at a different position

Wavelength and Visibility

Another aspect of visibility is wavelength – our eye can see only a certain range of wavelengths, usually at wavelengths from 380 to 700 nanometers. Visible light, when redshifted or blueshifted, can become invisible. If 380-700 nm wavelength doubles, then 760+ nm light is invisible to a naked eye, and if it is blueshifted to a half of wavelength 350- nm, then it is invisible too. And on the contrary, some light spectrum which was invisible can become visible after redshift or blueshift.

In the story with the candle, we shall wonder why the candle light is still visible after strong redshift (caused by time dilation). Candle light is produced from chemical reaction between candle wax molecules and the oxygen – from electron interactions of C and H atoms of the wax and O atoms from the air. Atomic time is autonomous / independent from the time of the environment / space. So, change to the wavelength of the light emitted by the candle flame occurs twice (from point A to point B, and from point B to point C):


Normal time in here, in the eye, and in the candle flame (in wax molecules, C, H, and O atoms and electrons)
Candle
A
B
C
Eye
D
Slow time with redshift Z
wavelength_A = wavelength_B*(Z+1)
wavelength_C = wavelength_B*(Z+1)
=> wavelength_C = wavelength_A
wavelength_D = wavelength_C
=> wavelength_D = wavelength_A

From point A to point B wavelength decreases (Z+1) times, and from point B to point C it increases (Z+1) times. So, to the eye (point D) it arrives unchanged at a visible range for the eye – in a usual spectrum at which candles glow. I simplified the explanation (actually, time in the candle A could be different from normal time at C, and normal time at C could be different from time in the eye D), but point is: adding layer B between A and C does not change A-to-C wavelength ratio, because it is divided by Z+1 between A and B, and then it is multiplied by Z+1 between B and C. Intermediate redshifts cancel out:

$$(\text{wavelength}_B / \text{wavelength}_A) \times (\text{wavelength}_C / \text{wavelength}_B) \times$$

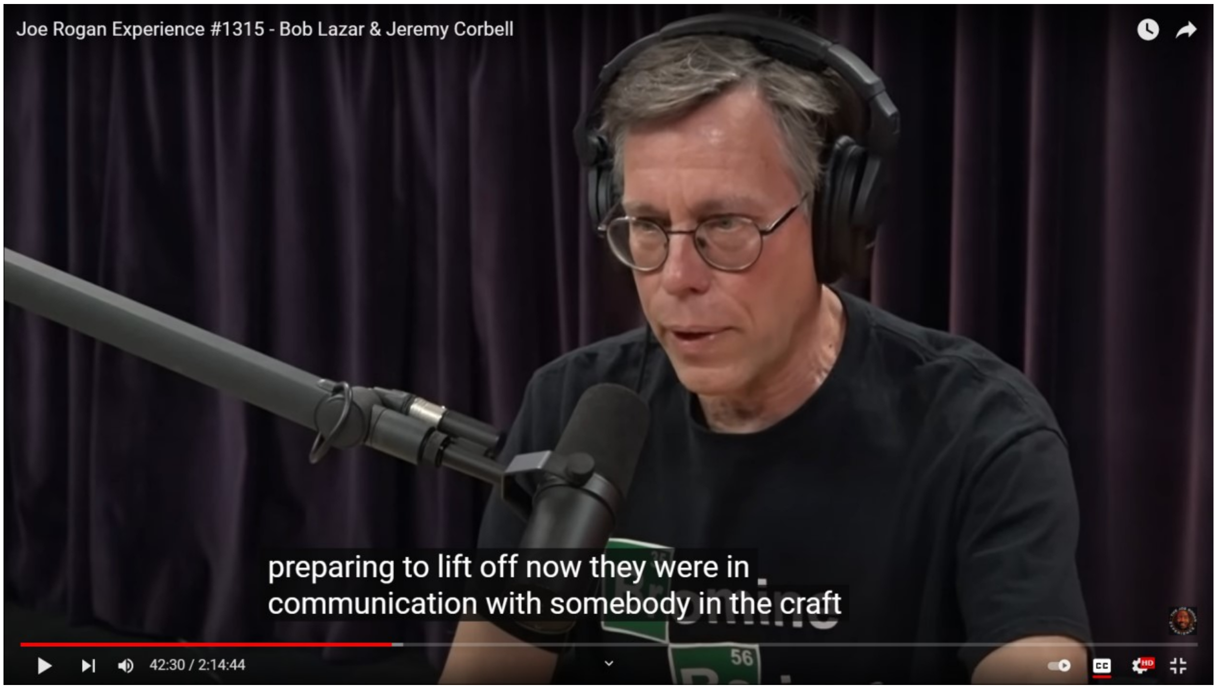
$$(\text{wavelength}_D / \text{wavelength}_C) = \text{wavelength}_D / \text{wavelength}_A$$

And wavelength ~ 1/Second – is in reverse proportion to time (faster time corresponds to “shorter” second and “longer” wave):

$$\text{wavelength}_D / \text{wavelength}_A = \text{Second}_A / \text{Second}_D$$

Thus, visibility depends on time speed at the beginning and at the end.

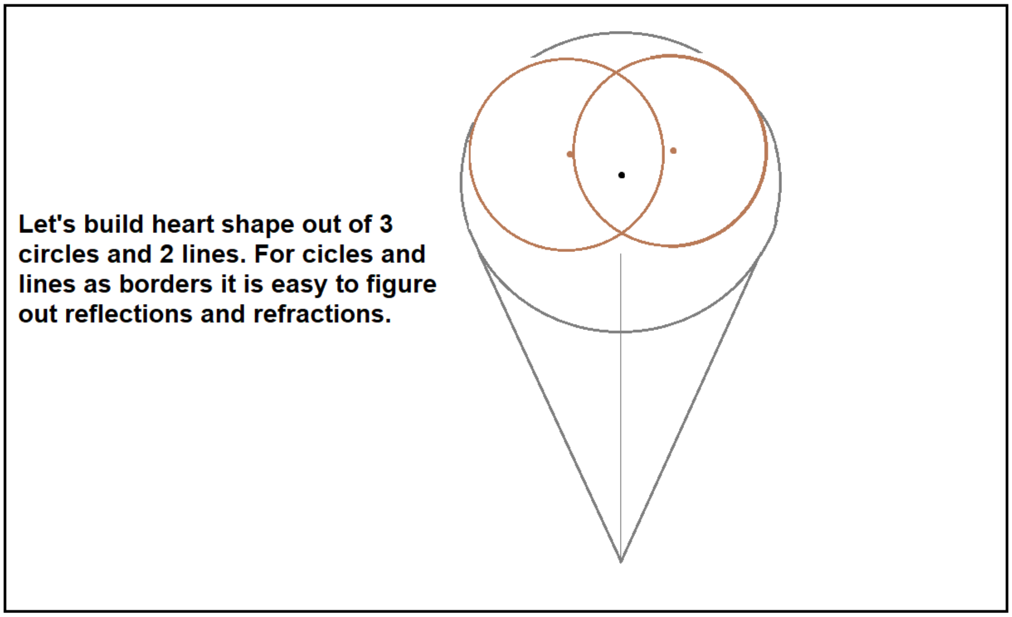
14. BOB LAZAR: INVISIBILE CRAFT AND RADIO COMMUNICATION



preparing to lift off now they were in
communication with somebody in the craft

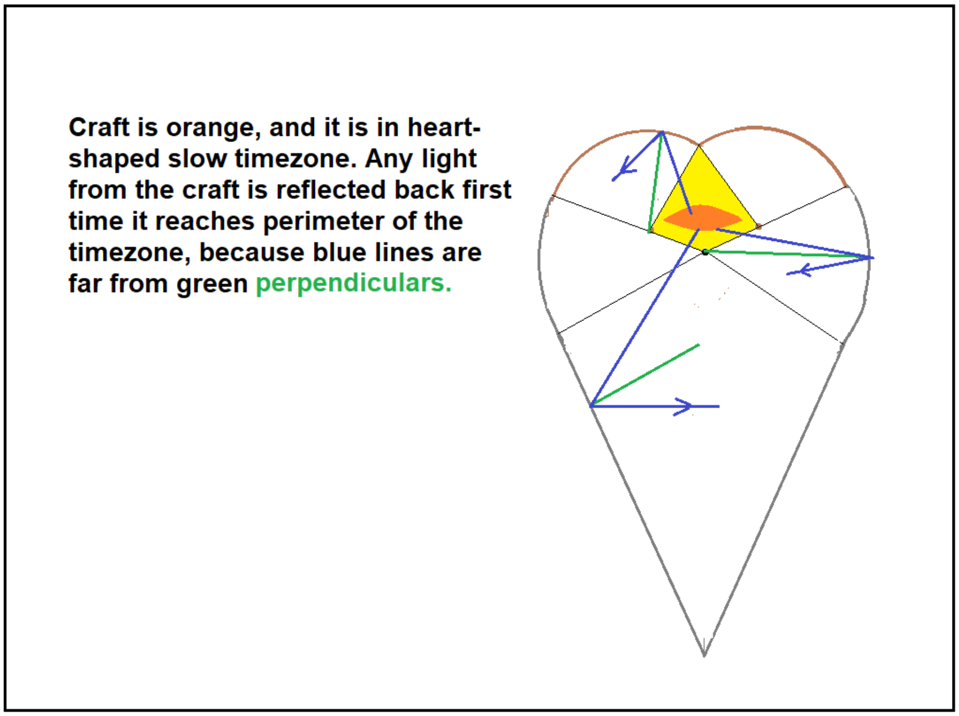
https://www.youtube.com/watch?v=BEWz4SXfyCQ&t=2541s

Bob described heart-shaped field around the craft, that was making it invisible when standing under the craft and looking up. But there was still radio communication between someone inside the craft and someone outside. Let’s reconstruct this shape on a paper:



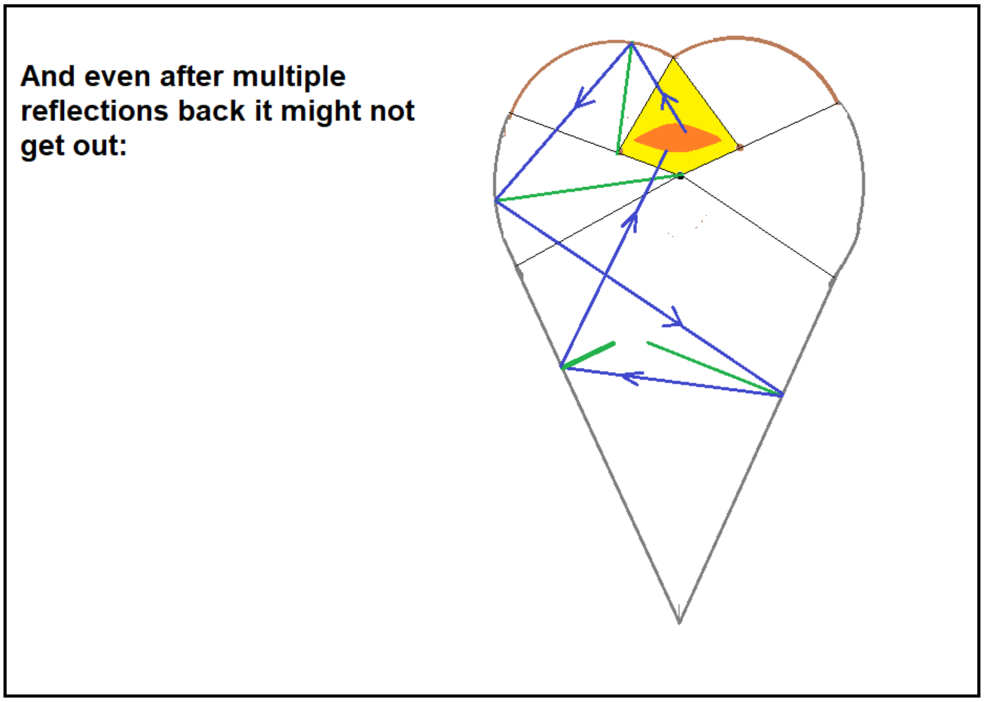
Let's build heart shape out of 3 circles and 2 lines. For cicles and lines as borders it is easy to figure out reflections and refractions.

Light that is not close to a perpendicular to a surface of the heart-shaped screen (in our case screen is made of circles and lines with green radius/perpendiculars) is reflected back:

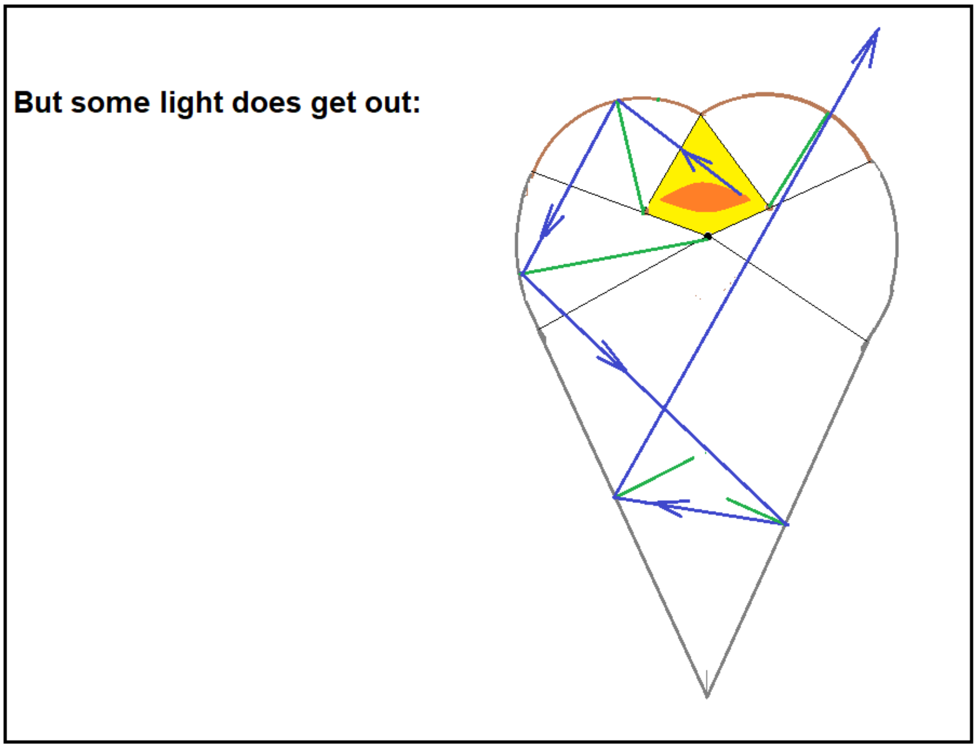


Craft is orange, and it is in heart-shaped slow timezone. Any light from the craft is reflected back first time it reaches perimeter of the timezone, because blue lines are far from green perpendiculars.

After multiple bounces back:



And even after multiple reflections back it might not get out:



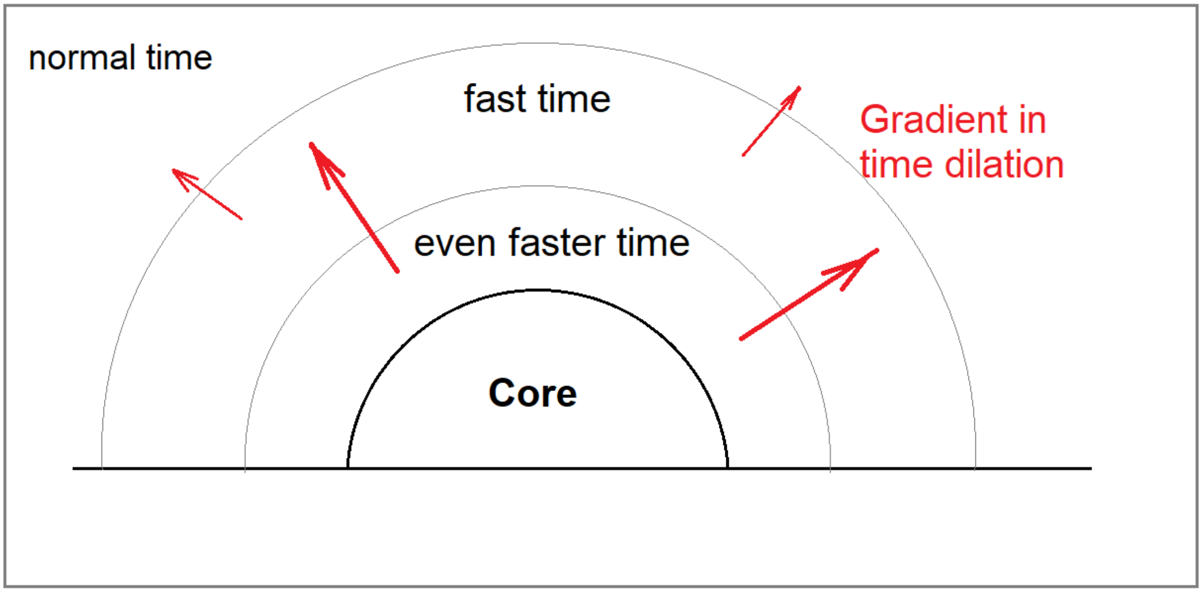
Radio wave and light are both electromagnetic waves. Radio waves are at a low frequency and visible light is at a higher frequency. So, radio waves and some light do get out somewhere – leak out somewhere. Light (and radio waves) trajectories do not depend on a direction: at the picture above, I can change arrow direction. So, radio communication went through the same "hole" in the screen where light got out. And perhaps, for simplicity and better reception, there was an antenna attached to the craft that poked the screen.

15. BOB LAZAR: TOUCHING WORKING CORE AND AVOIDING HIGH-Gs

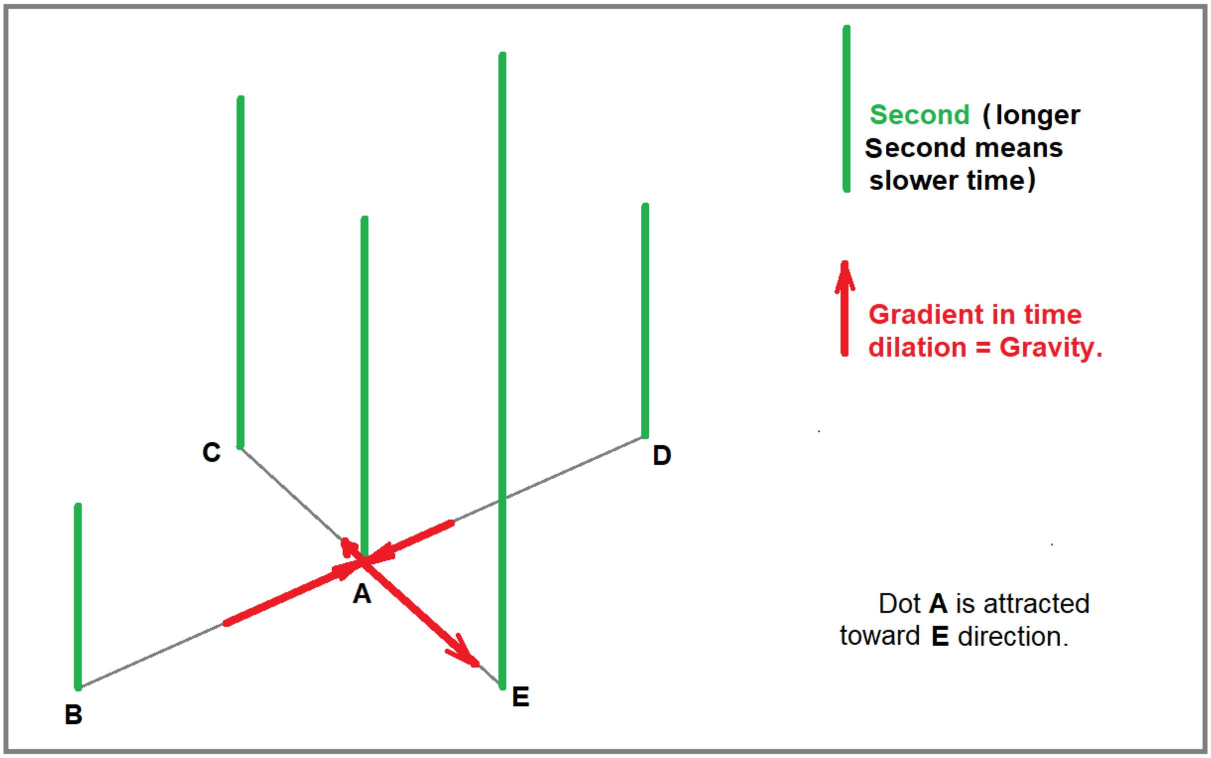
https://youtu.be/BEWz4SXfyCQ?t=560

Bob described that he could not touch the working core – it was “pushing back”.

That could be explained by time speeding up over the core (opposite to slowing it down around the craft):



Bob called it antigravity – “gravity 180 degrees”. It is good to discuss gravity: it is nothing but a gradient in time dilation. Like for a skier in mountains – if he relaxes – he will go by a steepest descend. Let’s measure time speed (“length of a second”, or where clocks run slower) around us (of course time difference cannot be detected by a wrist watch, because it is infinitesimal, but it is there and it causes gravity). While for us it is too small to detect, for Bob’s case, it should be significant and detectable both around the core and around the candle (see chapter 13).



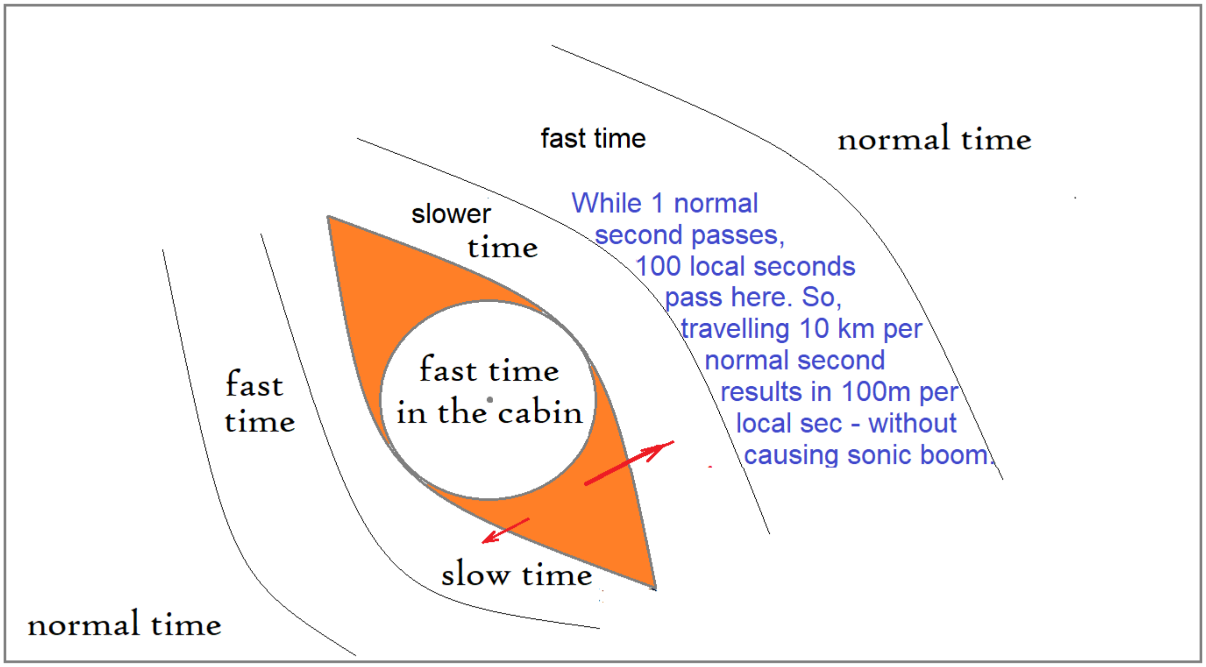
On the page 33 gravity is explained: energy of space is proportional to a Second (the slower time, the longer Second). So, in E-direction (picture above) energy of space goes up. So, when object moves to E – it displaces more energy than it displaced at point A, or in any other point - B, C, D. Displacing energy – means losing energy, so, point E is the point of minimum energy of the system (system = object + space). And system tends toward the minimal energy state. That is why gradient in time dilation = gravity.

That explains why Bob’s hands were pushed/pulled back from the core. Interestingly that the same effect explains how a crew of this craft survives high-Gs –

overloads on accelerations. If core propagates faster time all over the cabin, let’s say 10 times faster than normal, then 100g craft acceleration happens in 10 times longer period of time inside the cabin. You can do simple math and see – because acceleration is the change in speed, time participates twice in acceleration calculation (and measured in **m/sec^2**) – 100g acceleration is felt as 100g/**10^2** = 1g acceleration inside. Once acceleration is over, area of fast time could be shrunk (energy saving :).

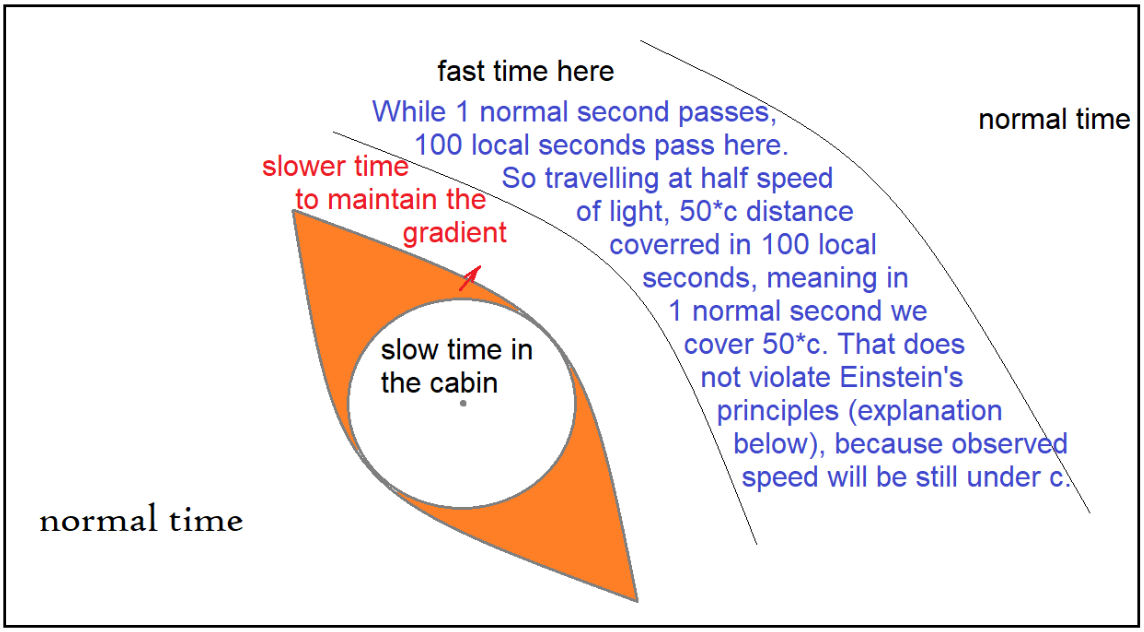
16. BOB LAZAR: CRAFT FLIGHT PHYSICS

Bob explained that the craft after it was raised above the ground, leaned to its side, so that its engine output at the bottom of the craft should point into the direction of a move:


fast time
normal time
slower time
While 1 normal second passes, 100 local seconds pass here. So, travelling 10 km per normal second results in 100m per local sec - without causing sonic boom.
fast time
fast time in the cabin
slow time
normal time

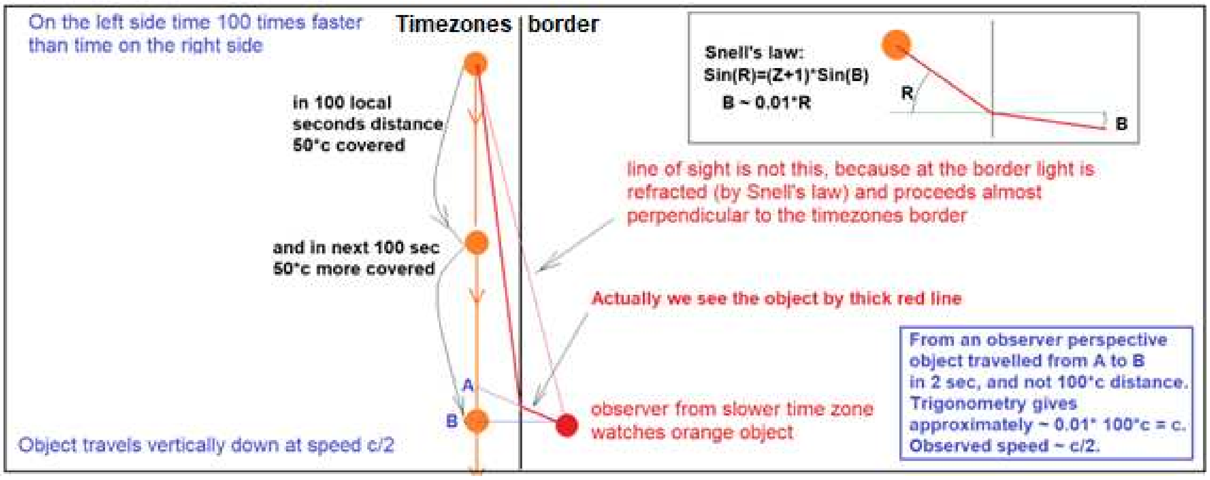
Gradients in time dilation (red arrows) show where craft is pulled in. And you may think of craft having skin made of slow time moves inside the fast time bubble. Thinking that fast time bubble is moving inside normal time is not entirely correct, because fast time bubble is not an object. I assume that there were some measurements made, because Bob talked about gravitational waves (which are not exactly the same as they were described in chapter 10, but similar from the time dilation perspective). I am wondering how “fast timezone” could suppress possible sonic boom - perhaps some kind of uneven shape of the borders between fast and normal time, or/and between slow time and fast time, was dissipating sonic waves (U.S. use uneven surfaces in stealth craft technologies for radio reflection dissipation).

Interstellar travel mode logically could be different.


fast time here
While 1 normal second passes, 100 local seconds pass here. So travelling at half speed of light, 50*c distance coverred in 100 local seconds, meaning in 1 normal second we cover 50*c. That does not violate Einstein's principles (explanation below), because observed speed will be still under c.
normal time
slower time to maintain the gradient
slow time in the cabin
normal time

Slowing time in the cabin, as in sci-fi movies, is to save crew's time on trip.

Fast time layer allows travelling beyond speed of light!? Let's validate if that violates c-speed limit from any perspective:


On the left side time 100 times faster than time on the right side
Timezones | border
Snell's law:
Sin(R)=(Z+1)*Sin(B)
B ~ 0.01*R
R
B
in 100 local seconds distance 50*c covered
and in next 100 sec 50*c more covered
line of sight is not this, because at the border light is refracted (by Snell's law) and proceeds almost perpendicular to the timezones border
Actually we see the object by thick red line
From an observer perspective object travelled from A to B in 2 sec, and not 100*c distance. Trigonometry gives approximately ~ 0.01* 100*c = c. Observed speed ~ c/2.
A
B
observer from slower time zone watches orange object
Object travels vertically down at speed c/2

For the observer on the left, object travelled 100×c distance in 200 seconds.

For the observer on the right, where time runs 100 times slower, only 2 seconds passed. And from his perspective object travelled from A to B, so no c-speed violation from his perspective either. And no spatial changes – time matters only!

And check chapter 22 on how a craft handles obstacles on its way.

17. BOB LAZAR: ELEMENT 115

Joe Rogan Experience #1315 - Bob Lazar & Jeremy Corbell

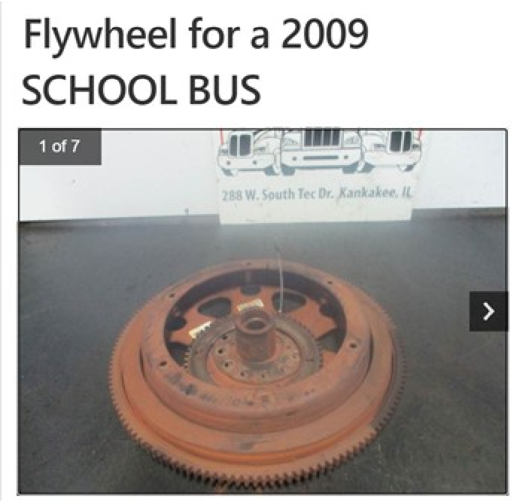
element 115 the fuel they had was stable
in other words it didn't decay it wasn't

https://youtu.be/BEWz4SXfyCQ?t=1666

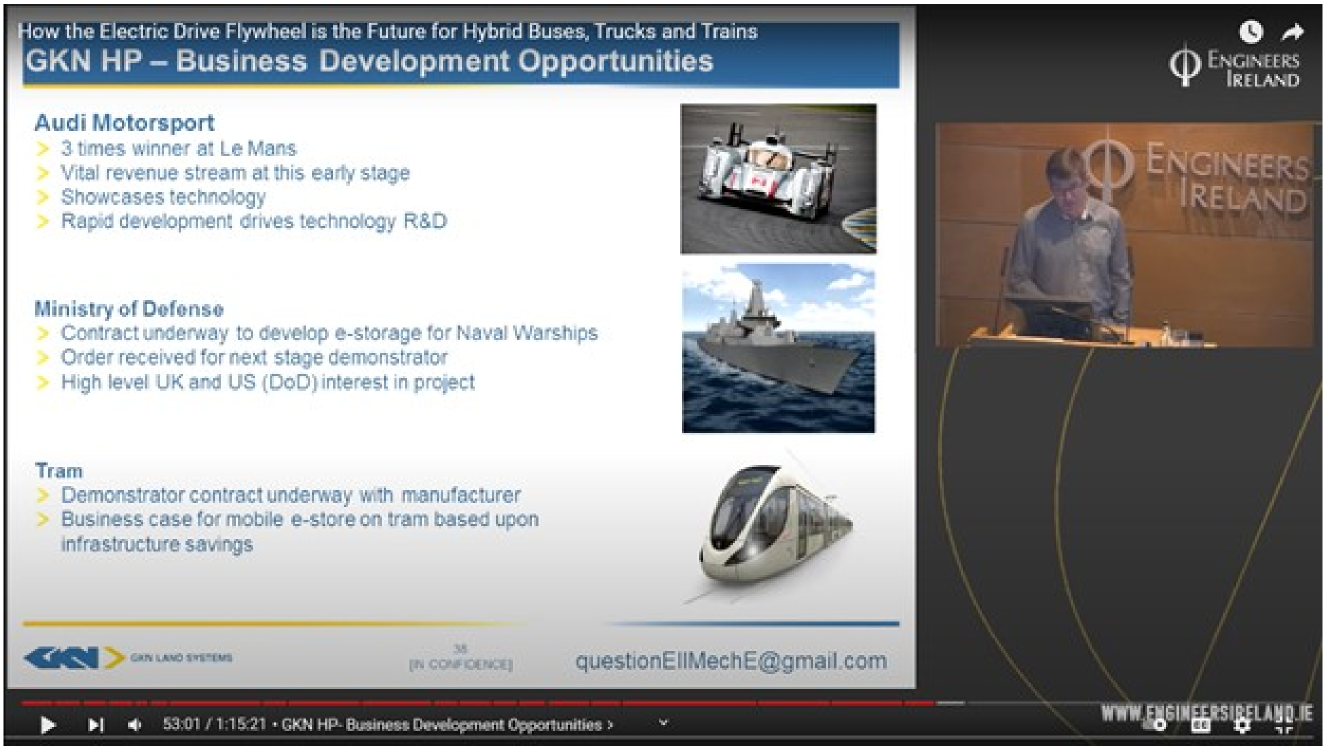
Bob explained that half a pound of stable isotope of element 115 was used as the fuel. In about 10 years after his story, this element, isotope named Moscovium, was synthesized and its half-life was 0.65 seconds. Bob suggests that natural isotope could be different (in number of neutrons).

Another explanation is possible. When particles and atoms are formed, they encapsulate time of the environment. Some of them can have very slow time canned inside, see chapter 11 for example of billion to trillion times slower time in particles. But even better, check chapter 27: if time within an atom slows down only 100 times, then its lifetime increases by 100^5, which is 10 billion times. And if atomic clock slows down 1,000 times, then its lifetime increases by $1{,}000^5$, which is 1,000 trillion times. Thus, if time in "where and when" this element 115 was created was 1000 times slower than our time, then lifetime of it increases from 0.65 seconds to 20 million years. Where is such time and place – with 100-1000 times slower time? Whatever we see around us has/had 12 times slower time at most, and it comes from the past, and currently slow time in galaxies centers and around heavy stars called "nearly black holes". But that's about it in our neighborhood. But CMB (Cosmic Microwave Background, from the outskirts of our Universe, see chapters 11 and 5) corresponds to billion-trillion times redshift – time dilation.

Next puzzle about element 115: half pound of it was packing an astronomical amount of energy – that alone contradicts with Einstein's $E = m \times c^2$, is it? Before checking that, let's look at something else called flywheel (ancient and well-known human invention - even Leonardo DaVinci was improving it). It is puzzling too, and energy calculations there relate to the element 115 energy problem.



Flywheel is a mechanical energy accumulator. Here is one used in U.S. school buses since the previous century. Nowadays, modern ring-shaped flywheels made of carbon fiber rolls and running in vacuum are installed on top-notch racing cars and more:



How the Electric Drive Flywheel is the Future for Hybrid Buses, Trucks and Trains

GKN HP – Business Development Opportunities

Audi Motorsport
- 3 times winner at Le Mans
- Vital revenue stream at this early stage
- Showcases technology
- Rapid development drives technology R&D

Ministry of Defense
- Contract underway to develop e-storage for Naval Warships
- Order received for next stage demonstrator
- High level UK and US (DoD) interest in project

Tram
- Demonstrator contract underway with manufacturer
- Business case for mobile e-store on tram based upon infrastructure savings

GKN LAND SYSTEMS

38
[IN CONFIDENCE]

questionEIIMechE@gmail.com

53:01 / 1:15:21 • GKN HP- Business Development Opportunities ›

https://youtu.be/PGVou1eWIEA?t=3181

Let's start far away: say we have an object of mass **M**, moving at a speed **V**. It has energy

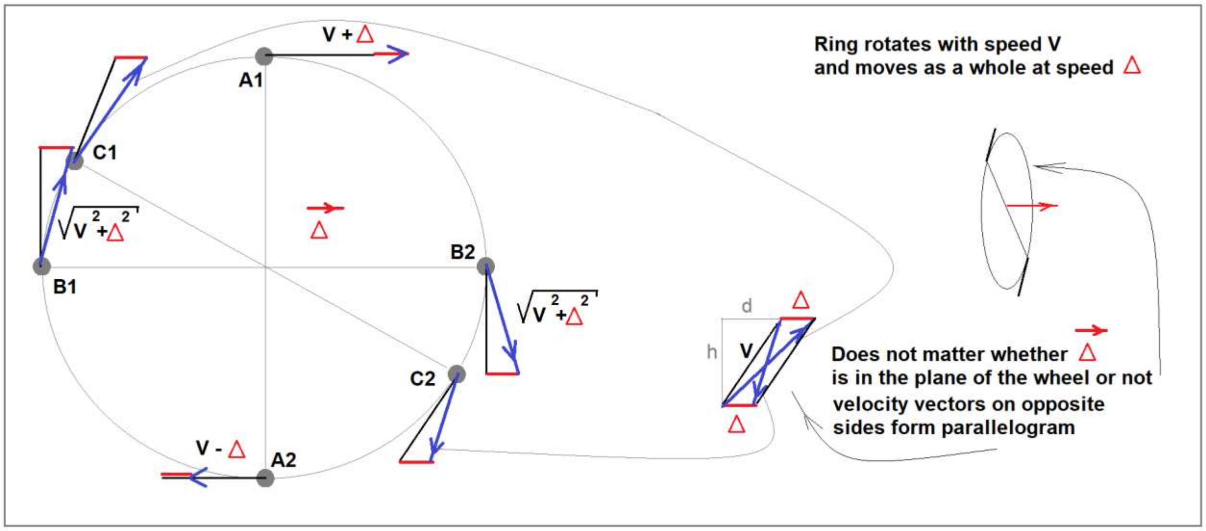
$$E(V) = M\times V^2/2$$

If the speed V is high, it is difficult to change it, even for a small change of speed Δ, because change of the energy ΔE will be big:

$$E(V+\Delta) = M\times(V+\Delta)^2/2 = M\times V^2/2 + M\times V\times\Delta + \Delta^2/2$$

$$\Delta E = E(V+\Delta) - E(V) = M\times V\times\Delta + \Delta^2/2 > M\times V\times\Delta$$

ΔE is a big number even for a moderate change of speed Δ when V is a large. Let's explore similar problem for a bus with a flywheel installed on it – changing speed or direction of the bus when flywheel is packed with energy and rotates at a very high speed:


V + Δ
A1
C1
√V²+Δ²
B1
Δ
B2
√V²+Δ²
C2
V - Δ
A2
Ring rotates with speed V
and moves as a whole at speed Δ
d
Δ
h
V
Δ
Does not matter whether Δ
is in the plane of the wheel or not
velocity vectors on opposite
sides form parallelogram

Let say all points A1, A2, B1, B2, C1, C2 have same mass M. Before bus start moving, energy of these points is $6\times M\times V^2/2$, but we will see that it is easier to track energy in pairs, opposite one another with the wheel center in between. When bus was not moving, energy formulas were:

$$E(A1)+E(A2) = M\times V^2/2+ M\times V^2/2$$

$$E(B1)+E(B2) = M\times V^2/2+ M\times V^2/2$$

$$E(C1)+E(C2) = M\times V^2/2+ M\times V^2/2$$

When bus has speed Δ, energy changes:

$$E(A1)+E(A2) = M\times(V+\Delta)^2/2+ M\times(V-\Delta)^2/2$$

$$\Delta E(A1)+\Delta E(A2) = M\times(V+\Delta)^2/2+ M\times(V-\Delta)^2/2-M\times V^2/2-M\times V^2/2 = M\times\Delta^2$$

$$E(B1)+E(B2) = M\times(V^2+\Delta^2)/2+ M\times(V^2+\Delta^2)/2$$

$$\Delta E(B1)+\Delta E(B2) = M\times(V^2+\Delta^2)/2+ M\times(V^2+\Delta^2)/2-M\times V^2/2-M\times V^2/2 = M\times\Delta^2$$

To calculate general case for points C1 and C2, I moved velocities at these points to the right on the picture above. This created a parallelogram, so the longer blue arrow's length by power of 2, by Pythagorean theorem, is: **$h^2+ (d+\Delta)^2$**. And the shorter blue arrow's length by power of 2 is: **$h^2+ (d-\Delta)^2$**. Initial velocity V in power of 2 is: **$V^2 = d^2 + h^2$**. So:

$$E(C1)+E(C2) = M\times(h^2+(d+\Delta)^2)/2 + M\times(h^2+(d-\Delta)^2)/2 = M\times h^2+M\times d^2+M\times\Delta^2$$

$$\Delta E(C1)+\Delta E(C2) = M\times h^2+M\times d^2+M\times\Delta^2 - 2M\times(d^2+h^2)/2 = M\times\Delta^2$$

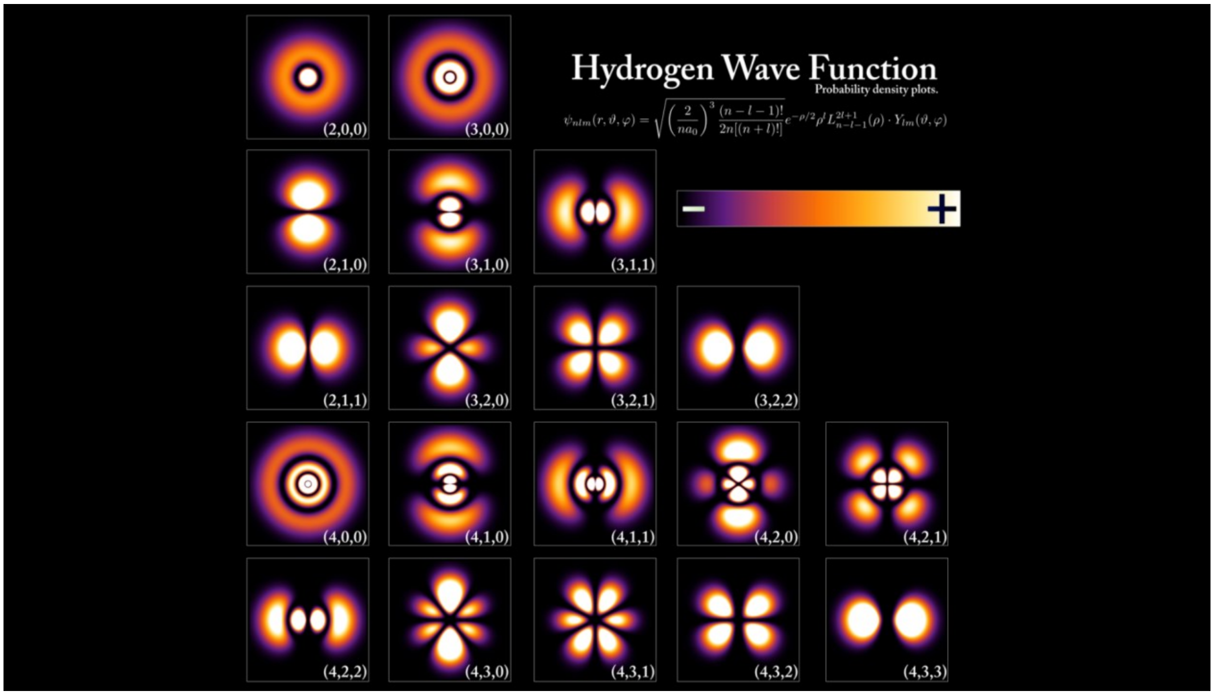
Energy of all pairs change by $M\times\Delta^2$, and for the whole wheel that results in

$$\Delta E = MW\times\Delta^2/2$$

where MW is the total mass of the wheel, and the division by 2 comes from “pairs” – number of which is “half”.

We have just confirmed that the energy canned in high RPM flywheel (high speed V) does not contribute to the bus inertia (energy change $MW\times\Delta^2/2$), otherwise it would be a collision hazard. The wheel weight does contribute to the bus inertia. This problem is solved in racing cars installations, where light carbon fiber flywheels are used instead of heavy steel.

Back to the element 115 with time inside slowed billions-trillion times. In “frozen candle” puzzle, we saw that for an external observer everything inside a slow timezone is hardly moving. For billions-trillion slower time that means even electrons “moves” and other particles “vibrations” become non-relativistic. I wonder if quantum physics (which is hundred percent statistical, because it describes $>10^{10}$ velocities in $<10^{-10}$ space) still works when time slows down dramatically. For us, it is important that these particles’ “trajectories” have central (point) symmetry:


Hydrogen Wave Function
Probability density plots.
$\psi_{nlm}(r,\vartheta,\varphi) = \sqrt{\left(\frac{2}{na_0}\right)^3 \frac{(n-l-1)!}{2n[(n+l)!]}} e^{-\rho/2}\rho^l L_{n-l-1}^{2l+1}(\rho)\cdot Y_{lm}(\vartheta,\varphi)$
–
+
(2,0,0)
(3,0,0)
(2,1,0)
(3,1,0)
(3,1,1)
(2,1,1)
(3,2,0)
(3,2,1)
(3,2,2)
(4,0,0)
(4,1,0)
(4,1,1)
(4,2,0)
(4,2,1)
(4,2,2)
(4,3,0)
(4,3,1)
(4,3,2)
(4,3,3)

So, we can apply the same math we applied for the flywheel to understand that these atoms and particles inertia is not impacted by amount of energy packed inside. That explains why half a pound of element 115 with slow time inside – meaning packed with energy (see chapters 4 and 8 for more) – can be carried around – literally half a pound and not tons. Classic "bus with flywheel" model shows that a bus at rest can encapsulate various energies. Similarly, an atom at rest can have various amount of energy: it can pack very different "time", and particles inside the atom can pack various "times". That challenges $E = m \times c^2$ paradigm of rest mass and energy equivalence (there is no rest in nature, in theory only).

To my knowledge, physics of slow time has not been developed yet. Let's try figuring energy formula for a slow time out of two well-known formulas:

Relativistic energy formula: $E = M \times C^2 \times (1-(V/C)^2)^{-1/2}$ (1)

Doppler shift formula: $Z+1 = (1+V/C)^{1/2}/(1-V/C)^{1/2}$ (2)

From (2) we can get $V/C = ((Z+1)^2-1) / ((Z+1)^2+1)$ (3)

Substituting V/C in (1) with the right side of (3) gives us:

$$E = M \times C^2 \times \left(1 - ((Z+1)^2-1)^2 / ((Z+1)^2+1))^2 \right)^{-1/2}$$

$$E = M \times C^2 \times \left(((Z+1)^2+1)^2 - ((Z+1)^2-1)^2 \right)^{-1/2} \times ((Z+1)^2+1)$$

$$E = M \times C^2 \times \left(4 \times (Z+1)^2 \right)^{-1/2} \times ((Z+1)^2+1)$$

$$E = M \times C^2 \times ((Z+1)^2+1)/ (2 \times (Z+1)) \qquad (4)$$

For brevity, I will use symbol D instead of Z+1. Then (4) shortens to:

$$E = M \times C^2 \times (D^2+1) / (2D) = M \times C^2 \times (D+1/D) / 2 \qquad (5)$$

where D is time dilation. Of course, formulas above are for an object moving in a straight line, and they are not about a non-moving object at rest (like $\Delta E > M \times V \times \Delta$ formula was for a straight movement, and not for a flywheel).

Formula $E = M \times C^2$ should be more like

$$E = M \times C^2 \times D^2 \qquad (6)$$

when we talk about energy encapsulated in an atom at rest, because measurements are in sec $^{-2}$, and time in the atom can be D-times dilated compared to the current time. D^2 factor explains half a pound of stuff containing an astronomical amount of energy. You can find the proof of formula (6) in chapter 20.

18. BOB LAZAR: GRAVITY AND STRONG FORCE

Gravity and Strong Force as Time Pressure

Bob explained that gravitational forces around the craft were generated out of “gravitational forces inside element 115 atoms” by amplifying them from an atomic to a regular scale. To his credit, he does not name this atomic force as strong force, as it is called in mainstream physics. Let’s debunk strong force first, as we debunked dark energy at the beginning of the book. And then we will reinstate Bob’s statement in more clear terms. As always, time dilation plays Occam's razor role.

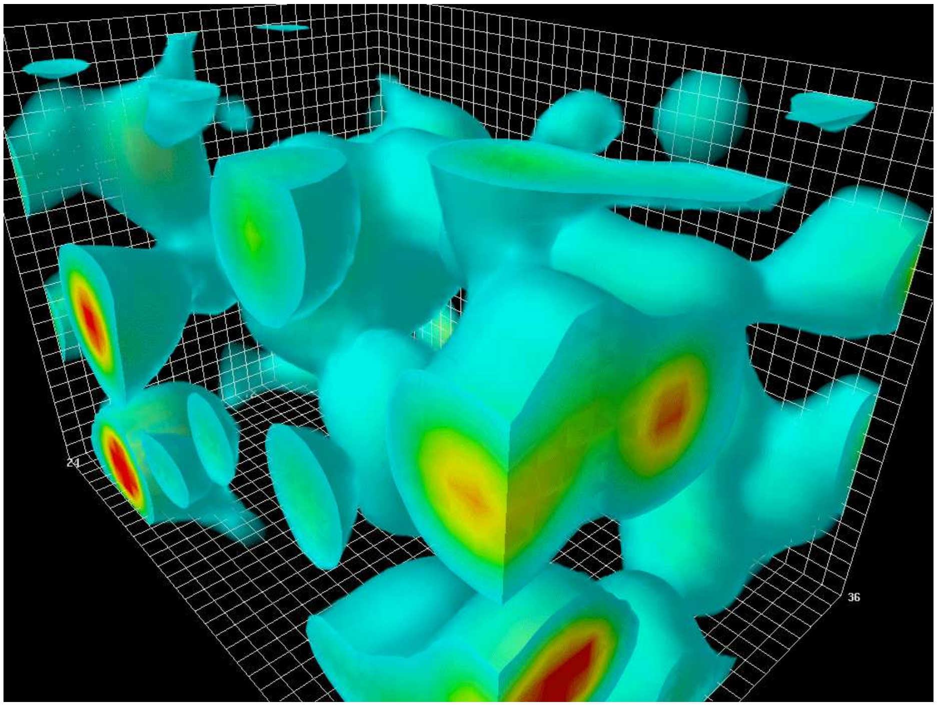
Mainstream physics states that protons and neutrons are pulled together into a nucleus of an atom by a force overriding repelling electric forces between positively charged protons. This atomic force is called strong force (the strongest in Universe): it is 100 times stronger than electromagnetic force, and 10^{38} stronger than gravity, but it weakens fast outside nucleus. But if that was true, then nothing would prevent neutrons coming together, some of them randomly decaying into protons, which never decay, and all of them still kept together by that magic force. Then heavy elements would be an abundance, and even more - many atoms would be as huge as neutron stars. But luckily, there is much simpler and more universal explanation: droplet of slow time holds protons and neutrons together. It is not particles attracting each other by an extra and very strong force – it is particles trapped together in a slow time “spot” (page 33 explains how high energy slow time, when displaced by an object, results in lowering energy of the system). The drawing at page 22 gives an impression about such spot (chapter 2 describes boost, and chapter 8 describes time energy). Time dilation (or redshift Z) at the border should be big - not to let these particles escape. And perhaps because such areas are dense in energy, they are small and have an atomic/nucleus/particle scale (there might be nested levels of time slowness – particles formed at even slower time than nucleus and atoms). Small radius (and/or high curvature of the border) limits an acceleration path allowing escape, if influenced externally or bounced internally. Now, it really reminds gravity, which is just a gradient in time dilation. The only difference is in the order of magnitude, for example: time dilation around Earth is of 10^{-9} magnitude, time dilation in spiral galaxies is of 10^{-3} magnitude (except in galactic centers, where it is higher). In element 115, to gain its stability, time should be dilated at least 10^{12} order of magnitude – that is why such atoms are rich source of time. And it could be dilated even more.

Now we can see what Bob Lazar meant by “gravity” from (element 115) atoms was amplified to the surroundings of the craft – it was about time dilation at atomic scale and time dilation around the craft.

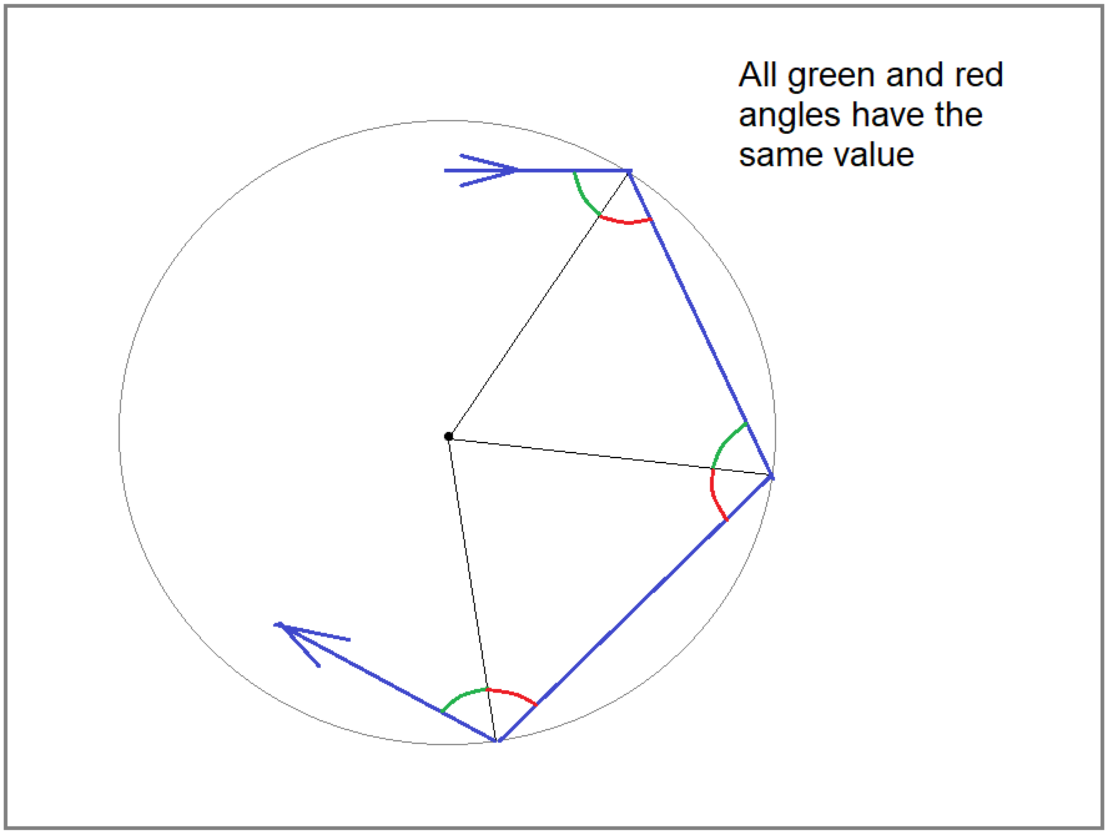
Let me give a simple quantum explanation of gravity without mass or math. We’ll use this experiment for the explanation:

> *Pore some water into a wide plate and put a bottle cork/cap into the water so that the cork/cap floats like a toy boat on the plate lake. With your finger start flapping water next to the cork/cap. The cork/cap will start floating away from your finger. Follow the cork/cap with your finger and continue flapping — the cork/cap will continue floating away.*

We’ll return to this experiment in a minute. Now some theory. Space vacuum is not empty — it is full with quantum fluctuations. And even inside matter, in spaces between atoms, and in spaces between particles inside atoms, fluctuations go on:

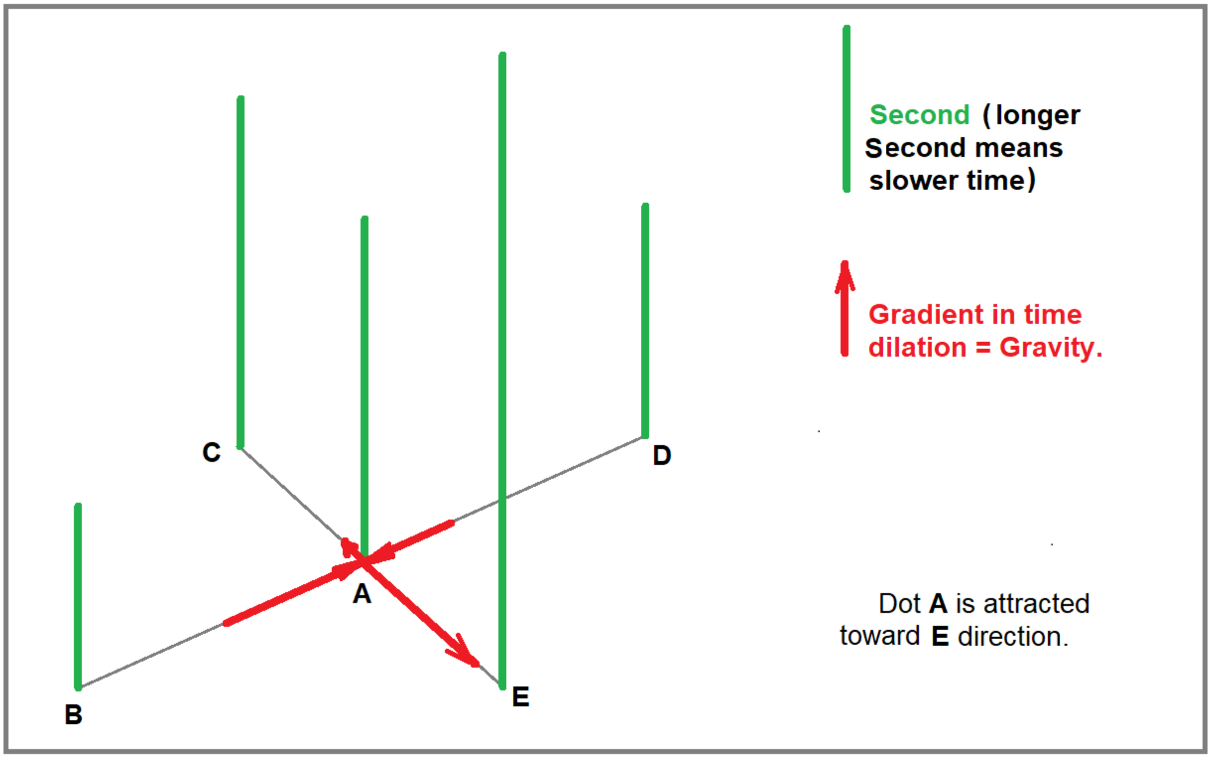


We already discussed Time Dilation (uneven flow of time) and how matter appears from uneven time: particles, nucleus and atoms are formed within droplets of slow time. By the way, there is an interesting theory by Dr. Vivian Robinson and Dr. Williamson claiming that all particles are just photons trapped in circular (or confined in space) vs. straight orbits and they form standing and self-enforcing electromagnetic waves. Such theory explains charge, spin, and mass origin for particles. Why I mention it here? — Because droplet of slow time is a perfect mirror/cage/trap for light:



And time in such bubbles, for example in very energetic cosmic rays' particles, can be billions or trillion times slower than the time we experience today.

Quantum fluctuations go on everywhere. For an external observer, in areas of faster time there will be more fluctuations than in areas of slower time. Now, what happens to a particle, or to an atom in an area with uneven time —where time runs faster on one side of the area vs. slower time on another side? Think about this particle as the cork/cap in the above experiment, and think about spacetime as water on the plate. On the faster time side near the cork/cap/particle there will be more water/quantum disturbances than on the slower time side. Let’s focus on fluctuations/disturbances at the fastest time side — the cork/cap/particle will float away from faster fluctuations/time in the slowest time direction. Now, it does not appear that slower time pulls the particle. It appears that the particle is pushed away by fluctuations on the faster time side. Particle is pushed by difference in time speed, and gravity is just a gradient in time dilation:


Second (longer Second means slower time)
Gradient in time dilation = Gravity.
C
D
A
B
E
Dot **A** is attracted toward **E** direction.

And now, if think of gravity as time dilation “force”, then it is far from being weak. For example, gravity on Earth comes from about one billion**th** time difference (a small time difference) on Earth and away from it. But if we talk about time difference at our feet level and our head level, then time difference at such short distance would be way less than one trillion**th** (an extremely small time difference). And that small difference in time flow weighs a lot to us! And in the Universe, and even more so inside particles, time differences compared to our time can be whole and very big numbers, thus, this “force” will be huge. Apparently, this force is universal (is present in Universe, in atoms, in particles, because fluctuations are everywhere outside and inside). Scientists say that gravity is weak, because Earth “weighs” 6×10^{21} tons, but we still can live on it and not smashed by its gravity. But now we understand, that it actually comes from less than trillion**th** rate in time differences (an extremely small time difference), and we still feel it as quite strong. *To be more precise, this time dilation gradient applies to each atom of our body (time difference at the "top" and at the "bottom" of an atom, which is an infinitesimal distance and time difference). Total of all tiny differences is called integral* ($\int \ldots dx$) *in calculus, which was invented by Newton when he was solving the gravity problem.*

Massless case! In chapter 2 I solved Vera Rubin’s puzzle about stars in spiral galaxies moving like a fish school — often changing direction and velocity, amazingly synchronous, and without collisions: it is because time in spiral arms runs faster than outside the arms. That explained “gravitational” irregularities in spiral galaxies and in our Milky Way: stars’ trajectories alter due to time dilation outside the arms (compared to the time in arms) alone, and that is **caused neither by some mass** nor by fictitious dark matter.

Another case for this would be the described by Bob Lazar propulsion system based on time dilation.

On other hand, **why we observe gravity around mass?** In chapter 8 we discussed that a matter object (with captured/canned slow time inside) displaces/pushes-away some time from the space of its location, just like an Archimedes object, when submerged into a liquid, displaces some volume of the liquid. Displaced time creates excess/irregularity of time, which is thicker (slower time) around such object. Thus, time dilation appears around mass and it manifests as gravity.

If you are interested in why “strong nuclear force” is so strong, check chapter 27, which explains why the stability of an atom is not linearly dependent on the atomic clock/time dilation D, but correlates to D^5.

Now we can say that quantum fluctuations are the universal clock or time (like temperature is Brownian motion). Time pressure (as pressure from quantum fluctuations) is gravity and strong force (which retains particles in the nucleus, see details in chapter 27).

19. REFINING THE BIG BANG DEBUNKING EXPERIMENT

"Even a broken clock is right twice a day."

Stephen Hunt

In the first chapter I suggested an experiment to prove that Hubble redshift comes from time speeding up. It is based on the fact that if a second becomes shorter, then the number of light harmonics (number of waves) decreases within a single second (and that is the reason of redshift). Clock used in the device for such experiment should be in sync with time of space for the duration of the experiment. Let me explain what that means first, and then I'll adjust the experiment to work even with a clock that is out of sync with the space time.

By now you know that second in space is "defined" as the time for a light to travel 299,792,458 m**.** Or/and such second is "defined" as time at which some process in Caesium-133 clock gives 9,192,631,770 oscillations. But atomic time is autonomous from the time of space - time speed in an atom can be different from time speed in the environment/space, and time change rate in the atom and space can differ as well. Even worse: process in the Caesium-133 clock that creates such oscillations (or any underlying process in another atomic clock, or even non-atomic clock) might depend on atomic time partially only and on environment time partially as well (process can span over atomic and space scale). Thus, there is no reason to believe that time-in-space and time-in-clock change at the same rate over the time. In the first chapter experiment, we expect time speeding up at the rate of 1.00000000007 a year (or 1.0000000000002 a day, if we run an experiment within a day). That means, if clock used in the device for such experiment is in sync with spacetime always, then wavelength of light increases at the rate of 1.00000000007 a year (or 1.0000000000002 a day). But what happens if clock time (atomic time) does not speed up at all: we will "see" no wavelength change because at the beginning of the experiment we counted waves in 1 second, but at the end of experiment we will count waves in 1.00000000007 second – in a longer period than one second of spacetime. How to resolve this issue if that is the case? Speed of light constant comes to the rescue: at the end of the experiment, if measure the distance that light travels in “1 second of atomic clock”, which is “1.00000000007 seconds of spacetime”, we will “see” that light travels 1.00000000007×299,792,458 m in “1 second of atomic clock” at the end of experiment that lasts for a year (or 1.0000000000002×299,792,458 m for the experiment lasts a day). Duration of the experiment matters from tool precision perspective only – tools used in one-day experiment should be hundred times more sensitive than tools used in one-year experiment. Now we have two variables – rate at which time speeds up in space over the duration of the experiment – let’s denote it D_{Space}, and rate at which time speeds up in clock used in the experiment – let’s denote it D_{Clock}. We should double check the clock setup at the beginning of the experiment, by checking what distance does light travel in one second of clock-time. Let’s assume that a Caesium-133 clock is used, and at the beginning of the experiment (I would double check this value anyway) light travels 299,792,458 m (or whatever TD_START m) in 9,192,631,770 clock oscillations. Let’s say, light emitted in the experiment had WL_START wavelength at the beginning. Then at the end of the experiment we measure distance that light travels in 9,192,631,770 of clock oscillations – TD_END m, and we measure light wavelength WL_END as well. Four values should be noted as the result of the experiment:

TD_START, TD_END, WL_START, WL_END.

These values are related through D_{Space} (rate at which spacetime speeded up in the experiment: if it stayed the same then $D_{Space} = 1$, if it slowed down then $D_{Space} < 1$, if it speeded up then $D_{Space} > 1$) and D_{Clock} (rate at which clock time speeded up: if it stayed the same then $D_{Clock} = 1$, if it slowed down then $D_{Clock} < 1$, if it speeded up then $D_{Clock} > 1$):

$$WL\_END = WL\_START \times D_{Clock}$$

$$TD\_END = TD\_START \times D_{Space} / D_{Clock}$$

Multiplying these two lines we get

$$WL\_END \times TD\_END = WL\_START \times TD\_START \times D_{Space}$$

And

$$\mathbf{D_{Space} = (WL\_END / WL\_START) \times (TD\_END / TD\_START).}$$

Type of the clock used does not matter. The same clock type should be used for wavelength measurement and speed of light measurement at the beginning and the end of the experiment. Duration of the experiment (day or year) should not matter, if instruments are precise enough to catch the difference between the beginning and at the end of the experiment. In the first chapter we assumed that

$$TD\_END / TD\_START = 1$$

which means “speed of light does not change (for the clock used)”, meaning “clock time is in sync with space time during the experiment”. No such assumption on clocks anymore.

20. JOULES AND ENERGY CONSERVATION

If your grandpa bought a house for $2,500 a long time ago,
and now you sell it for $250,000, then the price change is
*because of $ - **unit change** mostly.*

Throughout the book I was avoiding quantitative formulas for many reasons, but the main reason was the fact that variability of time makes many units and constants not constants at all. For example, a deadly acceleration, which is measured in m/**sec**^{2}, becomes not so deadly if time speeds up. Or, as I mentioned, Einsteinian popular formula $E = mc^2$ does not sound right when time of an object is D times slower than the time of the environment. In this case, it should be more like

$E = mc^2D^2$. Why?

sec is unit of measure used in "**number** of seconds" context. "**Second"** that I use throughout the book is "**duration** or length of a second". "Number of seconds" and "duration or length of a second" are inversely related:

Second ~ 1/sec

because of Einsteinian and Maxwellian speed of light constant: **Second** is the time it takes for light to travel 299,792,458 m. You can think

Second ~ 299,792,458 m/sec,

and since 299,792,458 m is a constant, we have

Second ~ 1/sec

That explains how 1/sec which is used in:

3) acceleration measurement
4) Joule - energy unit
5) gravitational constant G
6) Planck constant h

can throw quantitative formulas off and draw some physicists to wrong conclusions.

Let's focus on Joule: $J = kg\times m^2/sec^2$. When a particle was created in an environment, its energy was $E = mc^2$. Time canned in the particle has a speed of $Second_{Particle}$ and time of the environment has a speed of $Second_{Space}$, and there is no reason to believe they are the same now or eventually. Since this book proves that space time speeds up, let's denote by D the factor that measures how much time has sped up since the particle creation:

$$Second_{Particle} = D\times Second_{Space}$$

Energy $E=mc^2$ was canned in the particle and measured in Joules at the creation, with

$$Joule_{Particle} = kg\times m^2/sec^2 \sim (Second_{Particle})^2$$

But if we say that in our time with $Second_{Space}$, the energy that could be released from this particle is still $E = mc^2$, then we are wrong – because this number for us is measured in $Joule_{Space}$, where

$$Joule_{Space} = kg\times m^2/sec^2 \sim (Second_{Space})^2 \sim (Second_{Particle} / D)^2$$

The released energy is D^2 times less than the original - a violation of conservation of energy principle, despite the fact that the number mc^2 is still the same. It is like 100 lb and 100 kg are the same in number, but are actually different.

Because of this, the formula $E = mc^2$ should include the time dilation inside the object:

$$E = mc^2D^2$$

since we measure in Joules that are D^2 times less for us now.

In the nutshell: energy packed at one time and unpacked at another time should be the same actually, but not necessarily numerically, as the unit of measurement of energy (Joule) might have change. If your grandpa bought a house for $2,500 long time ago, and now you sell it for $250,000, then the price change is because of $ - unit change mostly.

21. LIFE HACKED TIME

There is Darwinian theory of organisms' evolution, which tells us story about rare radical mutations (evolutionary jumps) and gradual (or continuous) mutations "improving" organisms. And ruthless selection decides whether some mutation is advantageous for species or not. But nowadays scientists have become aware of extremely complex molecular machines running living cells, and some of such machines are of "irreducible complexity", meaning they are comprised of various parts, and without any part such machine has no use. That casted a shadow on Darwinian-like explanation on such machines being built gradually in evolution. Alternative theory called "Intelligent Design" arose, stating that cells and other life creatures "somehow" target certain functionalities as their evolutionary goals and "somehow" can see over dysfunctional gap from no functionality to functionality, so that functionality is achieved. They get the machine blueprint "somehow". Such features/machines are recorded in DNA once they are built, and to appear as result of random DNA mutations, it will require, for instance, 10^{74} mutations in DNA, and that is a big number: "bigger than number of atoms in Universe, and it would take more time than Earth has existed, or even more than 14B years from Big Bang".

By now we know that there was no Big Bang, and there should be no reasonable way of counting atoms in Universe, but we can do better than that – we'll show that life figured out a way to produce unimaginable number of mutations in a reasonable time. Let's start far away from a test I got during one financial job interview:

> *Having $10K and 1 hour, find a person who gets all heads in row on 10 tosses of a coin. Result should be reproducible: within another hour and with $10K you should find another person getting all heads in row on 10 tosses.*

There are two known solutions at least, one uses group of 10,000 people, but that is an unreasonable number of people to gather in one hour. Another solution, which is reasonable, starts with collecting a group of 1000 people. Game plan: each person is asked to toss a coin, and if he/she gets tails – then he/she leaves the group, but does not go away; and if he/she gets heads – then he/she tosses coin again … and so on, up to 10 attempts. Person is paid \$1 for each coin he/she tosses. Let's see what happens in average:

1) 1000 tosses, ~500 heads – stay, ~500 tails – leave
2) 500 tosses, ~250 heads – stay, ~250 tails – leave
3) …

9) 4 tosses, ~ 2 heads – stay, ~2 tails - leave

10) 2 tosses, ~ 1 heads!

Total number of tosses ~ 1000+500+250+…+4+2 = ~2000 when results are evenly distributed between heads and tails. But at steps 9 and 10, when number of tosses is small, results could be distributed very unevenly. Probability of failing the game (at step 10 all tails) is ~1/4. Cost of the whole (1-10) game is ~\$2K. Having \$10K, we can run such game 5 times. Because of these 5 rounds we asked all losers not to go away – to participate in next rounds. Probability of failing all 5 rounds is

$$\sim 1/4 \times 1/4 \times 1/4 \times 1/4 \times 1/4 = 1/2^{10} = 0.001$$

Meaning, we will win a round with 1–0.001 = 99.9% probability. Thus, we will have at least one winner with the probability of 99.9%.

If think back, this problem was about **time** actually – we have to find our winner in one hour. If we go with ~10,000 players, we will fail to gather them in one hour. If we go with one person tossing a coin ~10,000 times and waiting when 10 heads happen in row, we will fail again, as it is improbable for a person to make even 1,000 tosses in an hour (with checking results). So, we used a reasonable size group of 1000 players and translated 1-hour game into ~1000 hours of players' combined time. We hacked the time - we "made the time".

Life has figured out that mechanism long time ago – by cell division (replication). At a single person lifetime, a bacterium that divides once in a few days, will divide $2^{10,000}$ times (10,000 comes from number of days). It is approximately 1000^{1000} – a number difficult for us to comprehend (we know 1000^4 as a trillion). But there should be enough food and space for a big population of this bacteria family.

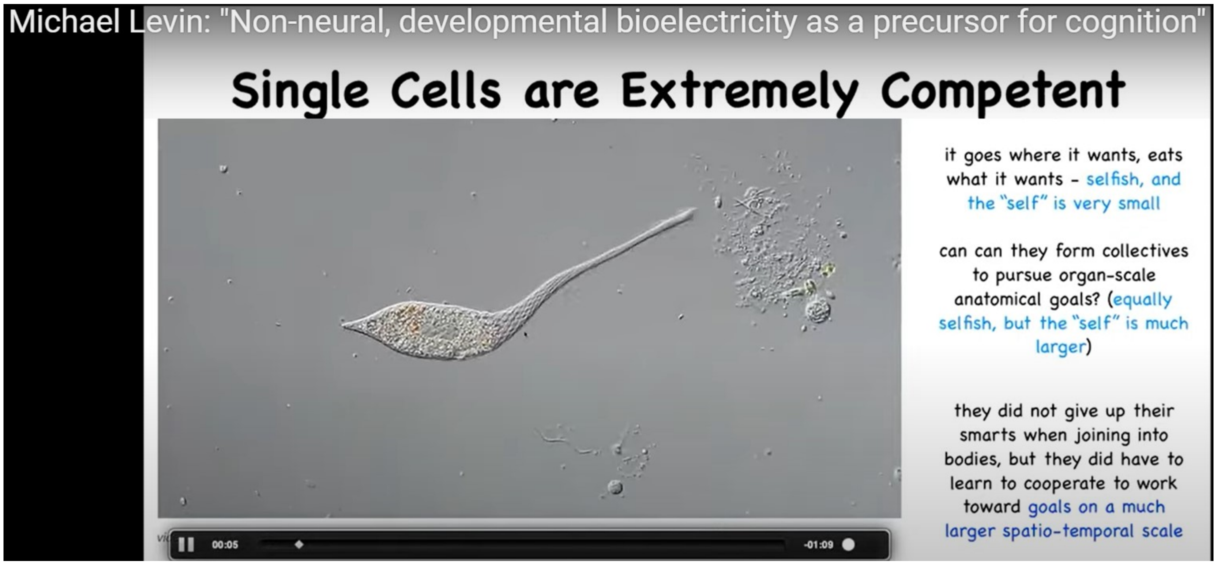
And ruthless and relentless selection shoots this number down as well. But anyway, such bacterium converts a time period we get used to into unimaginably big combined time, and probability of mutation 1 of 10^{74} does not sound improbable compared to 1000^{1000}. In the nutshell,

Darwinian life = solving problems, even without identifying them.

Compared to *Intelligent Design life = identifying problems and solving them*.

Last one definitely comes from human speculation and sounds like definition of intelligence.

Lifehack, that we described, works for cellular organisms (replicating often). But even for complicated organisms, like us, 99.99% of problems were solved at the time when single cell organisms evolved, and solutions were inherited and scaled up in multicellular species. Check please https://www.youtube.com/watch?v=3Cu-g4LgnWs&t=781s - is it giraffe or just a cell?



Michael Levin: "Non-neural, developmental bioelectricity as a precursor for cognition"

Single Cells are Extremely Competent

it goes where it wants, eats what it wants - selfish, and the "self" is very small

can can they form collectives to pursue organ-scale anatomical goals? (equally selfish, but the "self" is much larger)

they did not give up their smarts when joining into bodies, but they did have to learn to cooperate to work toward goals on a much larger spatio-temporal scale

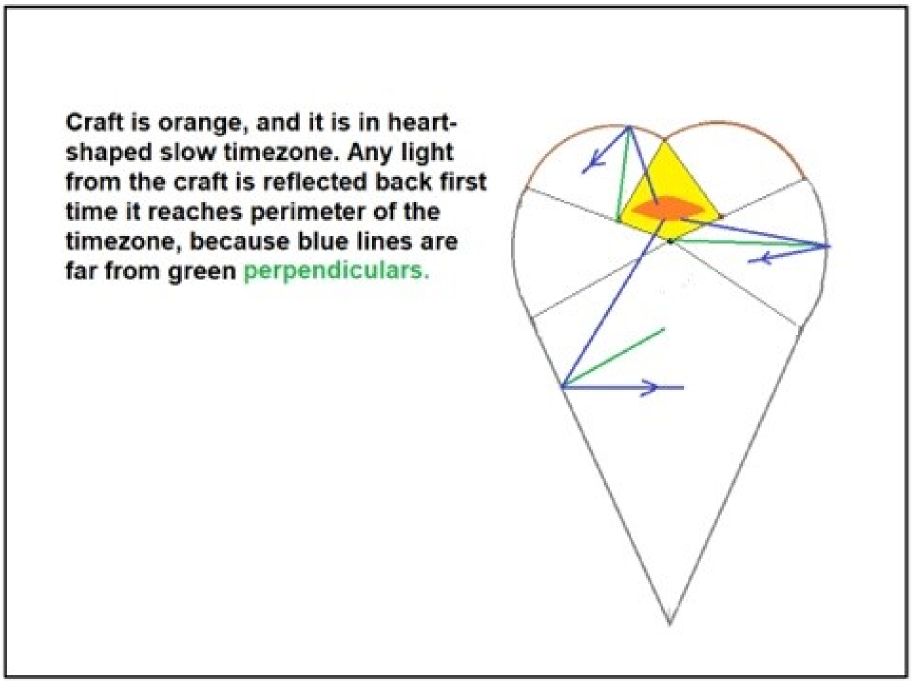
We – people still solve many problems even not noticing them and not identifying them as problems - most of them were solved and solutions are wired in us through our ancestors, a long time ago. Some really new problems that we come across and solve do not require 10^{74} mutations. But if we decide to grow wings, then mutations will kill us probably. Rarer than rare scenarios and environments described in chapter 5 aftermath – perhaps life appeared then and there, but evolved/adjusted on Earth.

Or … Let’s explore the possibility of ribosome creation on Earth. Did we make a mistake in assuming that the possibility of ribosome random creation is 1 of 10^{74}? Let’s take into account the Survivorship bias – a good example of how probability of event could be dramatically misinterpreted, though it seems right for an observer of the result. Although the probability of getting a particular ribosome, which we observe now, is 1 of 10^{74}, let’s change our perspective to the functional: “Ribosomes are macromolecular machines, found within all cells, that perform biological protein synthesis.” And if we ask “Is the probability of creating a molecular machine that perform biological protein synthesis 1 of 10^{74}?”, and if we consider that we know at least two very different ribosomes in prokaryotic and eukaryotic cells, then we understand that variety of such machines should be great, but very few have survived the selection. And if there could be, let's say, 10^{40} variations of protein-synthesizing machines, where some of them are very efficient and some of them are inefficient, then the probability of such machine creation is more like 1 of $10^{74} / 10^{40} = 10^{34}$, and that number can be supported by enough nucleotides on Earth for replications and mutations, considering that this process was distributed in millions or billions of years (that is ~10^{10} days or something like that). And if you remember from school Avogadro number, that is 6×10^{23} molecules in 22.4 liters of ideal gas, then with life probability we are getting to very realistic numbers.

P.S. Check recent research on proto-ribosome - maybe ribosome complexity is reducible and it has evolved after all.

22. WHEN FLYING SAUCER MEETS MATTER

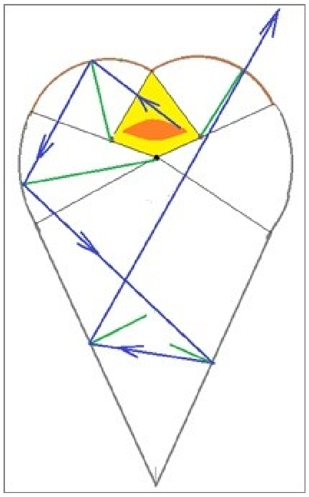
In chapter 14 we explored heart-shaped time dilation zone around the craft:



Craft is orange, and it is in heart-shaped slow timezone. Any light from the craft is reflected back first time it reaches perimeter of the timezone, because blue lines are far from green perpendiculars.

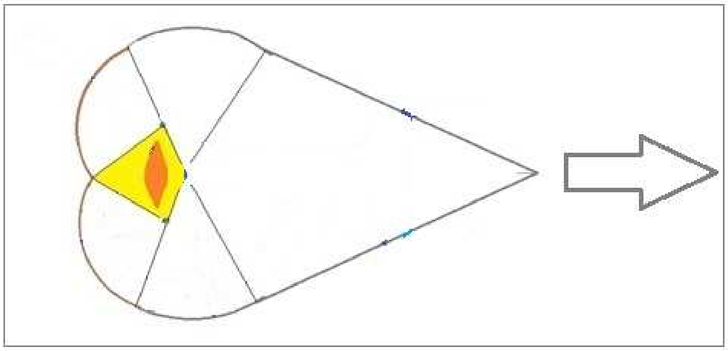
Yellow area marks "safety zone"

Bob explained that the craft is invisible to an observer standing under the heart. It is because of refraction and reflection explained in chapter 13: light from (or reflected from) the craft bounces back over the lower part of the heart, but it can still get out through the heart's upper side:



Can a beam of light shined from under the heart reach the orange craft? No. Why? If we were able to draw a light line/beam, starting from under the heart, that after the initial refraction/penetration at the heart wall and after several reflections/bounces over the heart walls reached the orange craft, then by the same but traversed back trajectory light from the craft can go backward and get out through the bottom of the heart. And that does not happen because the craft is invisible from below.

Bob described that the craft tilts to its side and moves in the direction where the sharp end of the heart points to, so if rotate the picture to its side, the craft's movement looks like in the picture below:



Now, what can we say about light, or about some objects, air, or water coming from the direction where the craft moves to? About light we already know: light from the heart bottom won't reach the craft, that means nobody in the craft can see in the direction of the travel — blind folded travel, right? Yes, but it depends on time dilation rate D: how much time inside the heart is slower than outside the heart. Let's do some recap on that factor D of time dilation:

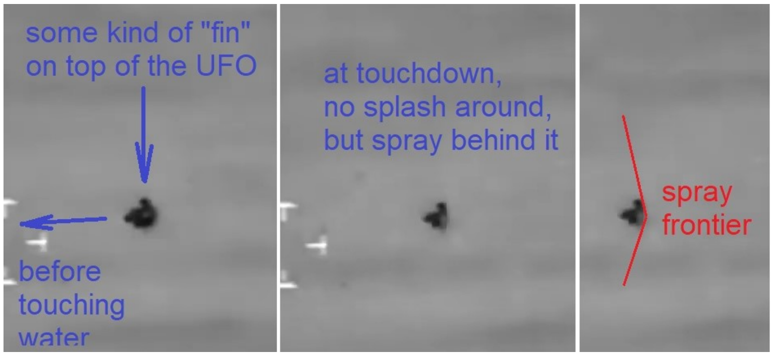
> *D is often denoted as (1+Z) in this book, where Z is redshift. D=1 or Z=0 means no time dilation and no redshift. It is important that refraction index by Snell's law is the same D (see chapter 1). In chapter 18 we discussed that gravity is caused by time dilation, and time dilation around the Earth is about 1.000000001 (Z value of one billion**th**, or difference between D and 1 is about one billion**th**), but to counter the Earth gravity even one trillion**th** rate for time difference will be enough, because time dilation at several meters above the Earth and on the Earth differ at less than trillionth rate.*

If the craft is still visible from the sharp end of the heart, then there is almost no refraction, meaning D is very close to 1, so light and objects from the bottom of the heart still can reach/hit the craft. But when the craft becomes invisible from the bottom, then refraction index D (which is time dilation) is a big number. We already know what happens to a light beam when it crosses the border of highly dilated time. Now to the question: “What happens to an object crossing the border between what I call timezones?” Object, when crossing the border, will get a very significant speed boost (details are in chapter 2) in the direction perpendicular to the timezones border, basically in the same direction where light is refracted to. That boost value is $(2Z+Z^2)/(2+2Z+Z^2)\times c$, where c is the speed of light. Or if rewrite it using D-term

$$\mathbf{boost = c-2c/(D^2+1)}$$

This is very close to the speed of light for big D-values. For example, if D = 2, then boost is already huge 0.6c. For D = 1.001 (which is time dilation outside the spiral arms), boost is 300 km/sec. And this boost solved Vera Rubin’s puzzle (chapter 2). Only for D = 1, when no time dilation, boost = 0.

As the boost is very close to the speed of light for big D-values, the object will move almost by the same trajectory as the light beam when entering the heart timezone from the bottom of the heart, and, like the light beam, it will miss the orange craft. And when it leaves the heart area, it will get the same value negative boost (loses the gained speed), so it comes out of the heart area at a speed close to the original speed, which is close to zero. That explains the lack of sonic boom even if the craft moves at supersonic speed in the atmosphere, and explains no significant splashes observed when it enters water:



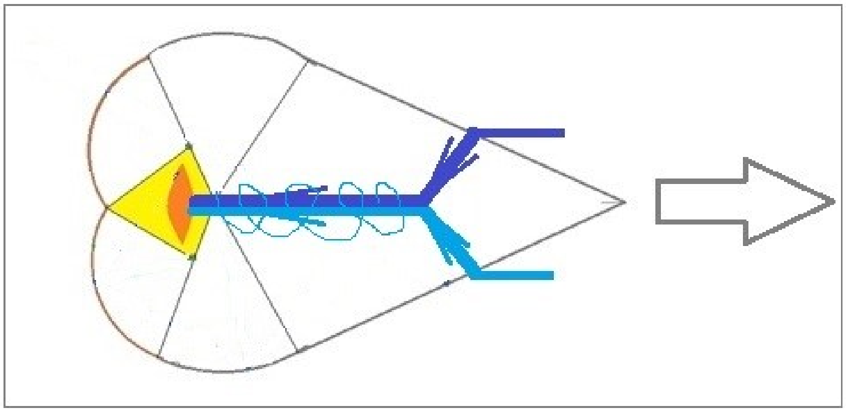
https://youtu.be/L5fkFw9zsgo

Spray behind UFO is explained below, but there is more to it. For significant D values (which is the case we are looking at):

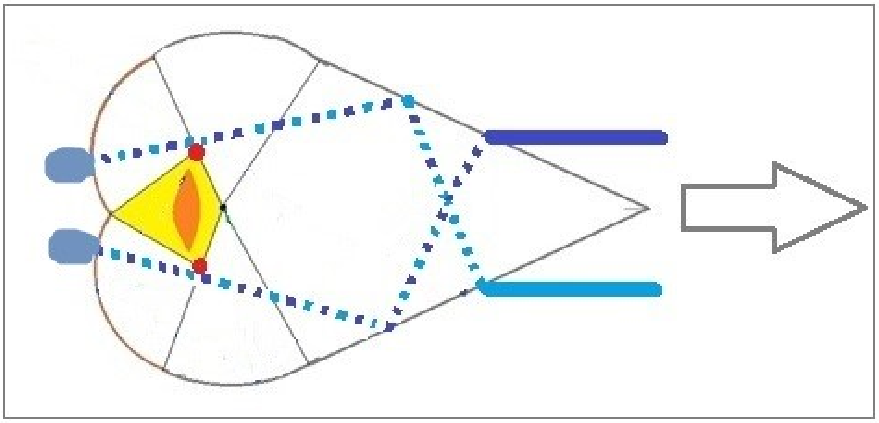
1. Any object will be destroyed when entering the heart area.
2. Air or water streams do not collide or whirl much inside the heart (otherwise these whirlpools would hit the craft).

1) A part of an object on entering a slow timezone is boosted significantly in speed and that boost will rip off that part from the rest of the object, which is still outside the slow timezone (because of inertia of the rest of the object). And the following few bounces of the object parts against the heart walls will finish whatever is left of the object. The only question remains: "Is it ripped apart to dust at molecular, atomic, or particles level?" My guess would be that it is ripped apart to the atoms (because chemical bonds between atoms are weak, compared to the strong ripping force, source of which was discussed in chapter 18), but I assume such tests were conducted in area 51 — Bob mentioned a craft in a hangar with a hole damage in it.

2) It seems that air or water streams coming through opposite sides of the heart area should mix inside and hit the craft:



But it is not what happens. Inside the heart area, the speed of air or water molecules (or atoms, into which they were ripped apart) increases dramatically (close to c), so these streams become discrete flows: molecules/atoms ripped at the border are enormously accelerated and separated from the following molecules/atoms. Most of them (molecules or atoms) miss collisions, and few of them, which do collide, basically exchange momentums / places. Thus, such streams pass through the heart area almost instantly in a discrete manner, and become continuous flow of atoms or molecules only after exiting the heart area:

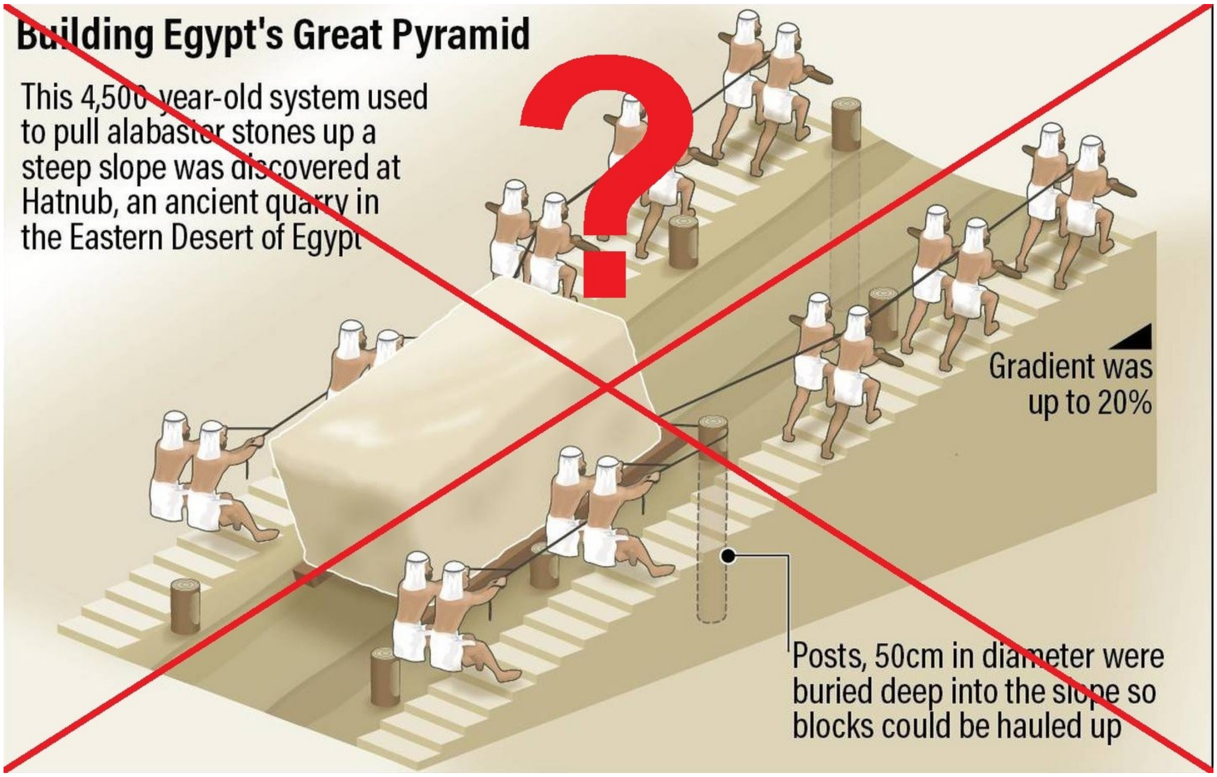


And on exit, their speed is back to close to 0, because the boost is lost when crossing the border out. By the way, the closer discrete beams pass to the red dots in the picture above (red dots are the centers of circles forming the top of the heart) the more chances for the beams to get out (by Snell's law: the closer a beam to a border perpendicular, which is a radius, the better chances for it to refract/cross the border, rather than get reflected/bounced back).

I think the energy of the craft is enough to travel through a wall (by evaporating it into dust of atoms as we discussed above), but what kind of wall? Check chapter 20 on $E = mc^2D^2$, which is Einsteinian formula $E = mc^2$ with time dilation D accounted for the energy of slow time trapped/canned inside matter (atoms or particles). In our case, D is time dilation of slow time trapped/canned inside half a pound of element 115 fuel, described by Bob Lazar. D in this case is not time dilation around the craft (time dilation around the craft can vary). D in this case is dilation of the time whenever/wherever these element atoms were created in comparison with our time. Time in the Universe was very slow then, and it tends to only speed up. It is well explained in my book. Very slow time inside these atoms gives them stability (long lifetime from our perspective, vs. synthesized in our time Moscovium, which is radioactive/unstable), and that D^2-factor provides an astronomical amount of energy.

Having such an engine and 500 pounds (per Bob Lazar) of such fuel, a tunnel boring company could build/evaporate through dozens of “Eurotunnels” and a space company could put thousands of satellites on Earth orbit without even breaking a sweat and without burning million tons of fossil fuels.

And this technology is ancient, from some archeological dug out, according to what Bob Lazar was told. That should solve the mystery of 70-ton granite beams carved and installed in Egyptian pyramids, once people with brushes step forward.


Building Egypt's Great Pyramid
This 4,500-year-old system used to pull alabaster stones up a steep slope was discovered at Hatnub, an ancient quarry in the Eastern Desert of Egypt
?
Gradient was up to 20%
Posts, 50cm in diameter were buried deep into the slope so blocks could be hauled up

https://www.thenationalnews.com/uae/science/new-discovery-sheds-light-on-remarkable-techniques-used-by-ancient-egyptians-to-construct-the-pyramids-1.788718

23. UAP ≠ UFO

Everybody who is curious about UFOs probably wonders why the media suddenly renamed them into UAP (UAP is abbreviation for Unexplained Aerial Phenomena), just before the first Congressional hearing on UFOs. Now such hearings are about UAP only. Although for the public, it seems to be no difference, for those who run the show, the difference is in what can be publicized. What is this about?

In chapter 12, I analyzed the physics of two events that are not related to any "flying object", but "bubble of slow time". Such bubbles are not noticeable, unless something is trapped inside them, for example, ball lightning:

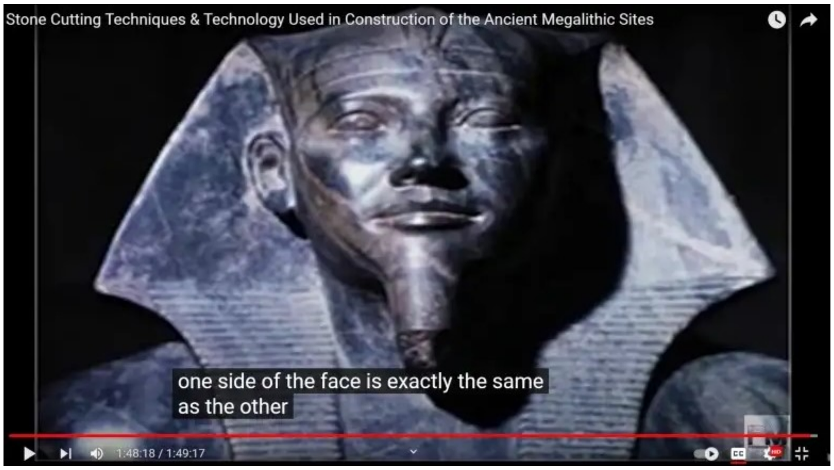
https://www.youtube.com/watch?v=_gOIQCI9Tgg

is the most common observation of such phenomenon, when lightning is trapped in such a bubble. Areas of slow time are abundant in Universe, for example, because of them, stars in our Milky Way and any spiral galaxy move like fish school, often changing directions and velocities. Literally, UAP refers to such bubbles of slow time, though "air" has nothing to do with it. And there is no craft/vehicle inside those UAP that are allowed to be publicized in the Congress.

Another story is about a craft that flies by creating a bubble of slow time around it (basically, such a craft replicates a natural phenomenon), described by Bob Lazar. I explained half a dozen of his anecdotes just by time dilation effects. Literally, UFOs — Unidentified Flying Objects — are about such crafts, and, as 30+ years since Bob Lazar's and George Knapp's leak have shown us, they are not meant for the public.

Secrecy around UFOs reminds me of the history of two inventions. One of them — Nuclear Bomb: the atomic research around radioactivity was public until 1932 British discovery of Neutron that overcame Coulomb barrier. After that, a top-secret treaty between UK and US was signed about Nuclear Bomb development. Another interesting invention is Radar — microwave generators — was shared by UK with US within an air defense program. Even for US scientists back then, it was a magical alien device until the secret was unveiled and it became just a microwave oven.

Bob Lazar stated that he was told the crafts were dug out in an archeological discovery but not captured from some aliens. Maybe this technology was used in Egyptian sculpting and architecture, due to its abilities to cut any material (by evaporating it) and to counter gravity:


Stone Cutting Techniques & Technology Used in Construction of the Ancient Megalithic Sites
1:48:18 / 1:49:17

one side of the face is exactly the same as the other

https://youtu.be/0CeKA8_X0DA?t=6442

https://youtu.be/Qs9qHQB9IBw

24. THERE IS NO EVENT HORIZON

Event Horizon and Black Holes "appeared" as the result of math paper by Schwarzschild — where he calculated now called after him Schwarzschild radius: as if space around very dense/heavy object collapses and nothing at a certain radius around it can get out, not even magnetic field from such dense star can be observed outside. Schwarzschild wrote his paper in the trenches of WWI and sent it to Einstein. Although Einstein did not find math mistake in it, he said that it was some kind of math conundrum and that space could not be broken physically. Nevertheless, he supported Schwarzschild to get him out of war trenches.

Recently, Dr. Vivian Robinson found "simple rounding math" mistake in Schwarzschild's paper, his presentation is available on YouTube. Dr. Robinson is known for electron microscope improvements and for his advances in particles physics with Dr. Williamson. For those who know GR/math, quick elaboration from Dr. Robinson is included below. And there are other confirmations and reasons for nonexistence of event horizon:

- Polarized images show that space is not broken around black holes — magnetic field reveals itself and it comes not from the garbage around. If it was coming from the garbage, which orbits non-penetrable for magnetism area, then magnetic field would be donut-shaped like in Tokamak, and not like the observed regular magnetic field coming out of the star poles.
- Eric Lerner, who introduced "nearly black holes" term (for heavy stars where strong time dilation prevents their ignition), claimed that it would take infinite time for event horizon to rise due to the time dilation that becomes infinite (time stops) at event horizon.
- In this book I explained that energy of spacetime is proportional to a local Second (and time is always local), thus "black hole" energy would be infinite, and that would violate the energy conservation principle. Thus, black holes do not exist.

- Chapter 18 explained gravity and time (and even strong nuclear force) as quantum fluctuations. Quantum fluctuations have no reason to stop at a star “border”, an atomic “border”, a nucleus “border”, or a particle “border”. For Ancient Greeks, an atom was a black hole too.

Quick elaboration from Dr. Vivian Robinson

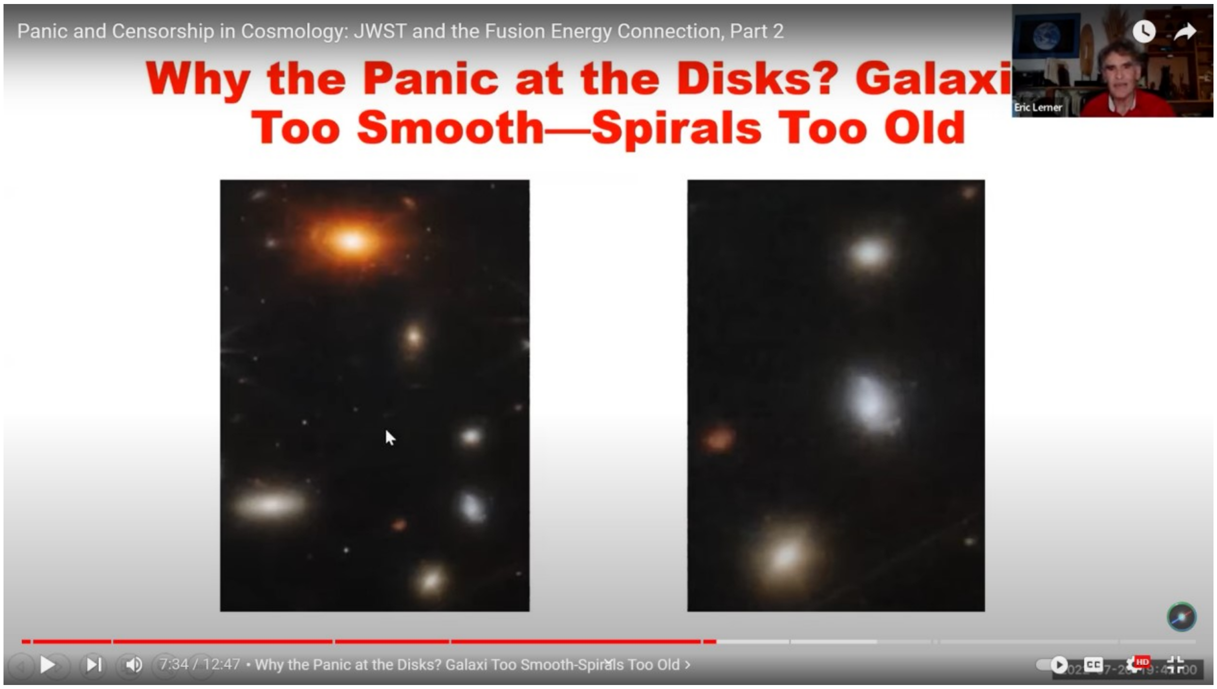
Approximation culprit 1/(1+x) ≠ 1-x

“I have a printed and updated version in an Institute of Physics (UK) Journal. You can view it at: https://doi.org/10.1088/2399-6528/abee2f. It is worth pointing out that Einstein derived the term 1/(1+alpha/r). He approximated it to (1 — alpha/r). Within the solar system, that is a valid approximation when alpha/r is less than 10^{-6} and experimental accuracy is less than 1 in 1000. When Schwarzschild derived his metric, he continued that approximation as he derived the term (1 — alpha/R), where R = $(r^3 + \text{alpha}^3)^{1/3}$. When r = 0, R = alpha, so (1 — alpha/R) only goes to zero at r = 0. The inverse, 1/(1 — alpha/R) only goes to infinity at r = 0. If you look at equation (29) in my above referenced paper, which is an exact solution to Einstein’s field equations, you will find it also gives an infinity at r = 0. For r >> alpha, as applies in our solar system, Schwarzschild’s solutions give the same result as obtained from Einstein’s calculations. There was no need for Einstein to find fault in the mathematics. Those who followed Schwarzschild replaced R with r. There was no justification in mathematics or physics for that change. It was that move that gave rise to 1/(1 — alpha/r) term that predicts the singularity at r = alpha. **That is a simple mathematical error for which there is no justification. It makes me wonder if any of the cosmologists who rave on about black holes ever read either Schwarzschild’s solution or Einstein’s derivations of his field equations. Singularities at r = alpha can’t be derived from either Einstein’s field equations or Schwarzschild’s solution.**”

25. ERIC LERNER: NO BIG BANG IN JWST IMAGES

30 years ago, Eric Lerner published "The Big Bang Never Happened" book, which was labeled as "atheistic" by the mainstream. By then, three versions of Big Bang theory failed. And later, the fourth version patched with Dark Energy failed on Hubble constant measurements vs. predictions. Eric Lerner presented more than dozen scientific evidences for nonexpanding Universe and for its **age**, if such concept applies, exceeding 100 billion years (vs. expanding Universe since its birth in Big Bang about 14 billion years ago). The only problem Eric Lerner has not explained was Hubble redshift cause, which I solved in chapter 1 of this book (time dilation in the past = redshift today).

Eric Lerner started "JWST AND THE BIG BANG NEVER HAPPENED DEBATE" on his YouTube channel LPPFusion. I like this episode about abundance of well-formed/mature galactic disks in "infant" Universe:



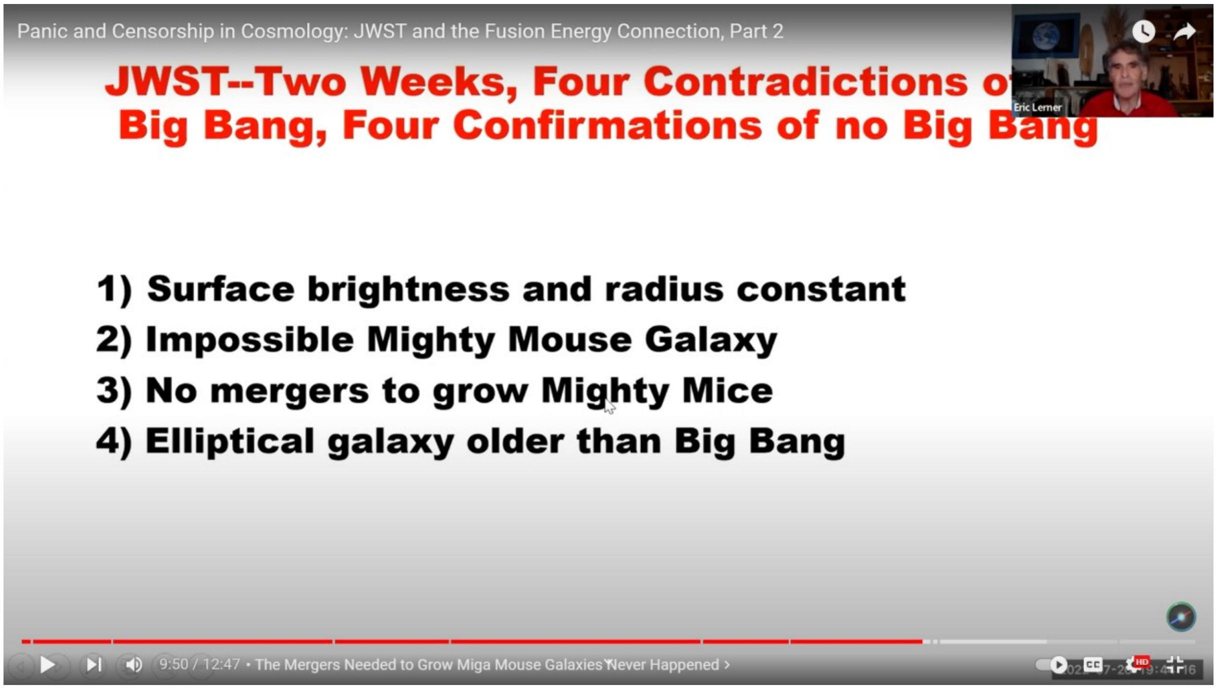
Panic and Censorship in Cosmology: JWST and the Fusion Energy Connection, Part 2

Why the Panic at the Disks? Galaxi Too Smooth—Spirals Too Old

Eric Lerner
7:34 / 12:47 • Why the Panic at the Disks? Galaxi Too Smooth-Spirals Too Old ›

https://www.youtube.com/watch?v=eUv4vceKuIg&t=446s

followed by even better episode


Panic and Censorship in Cosmology: JWST and the Fusion Energy Connection, Part 2

JWST--Two Weeks, Four Contradictions of Big Bang, Four Confirmations of no Big Bang

1) Surface brightness and radius constant
2) Impossible Mighty Mouse Galaxy
3) No mergers to grow Mighty Mice
4) Elliptical galaxy older than Big Bang

Eric Lerner
9:50 / 12:47 • The Mergers Needed to Grow Miga Mouse Galaxies Never Happened ›

https://www.youtube.com/watch?v=eUv4vceKuIg&t=596s

about elliptical **galaxies older than Big Bang**. Elliptical galaxies, in general, are older than spiral galaxies. With spectroscopic data analysis we expect even more galaxies and stars, by metals in them, “older than Big Bang”.

26. MATERIALS USED IN FLYING SAUCERS

Germanium-75 and Element 115 in UFOs

*(***IFO***s* actually— ***I****dentified* ***F****lying* ***O****bjects).*

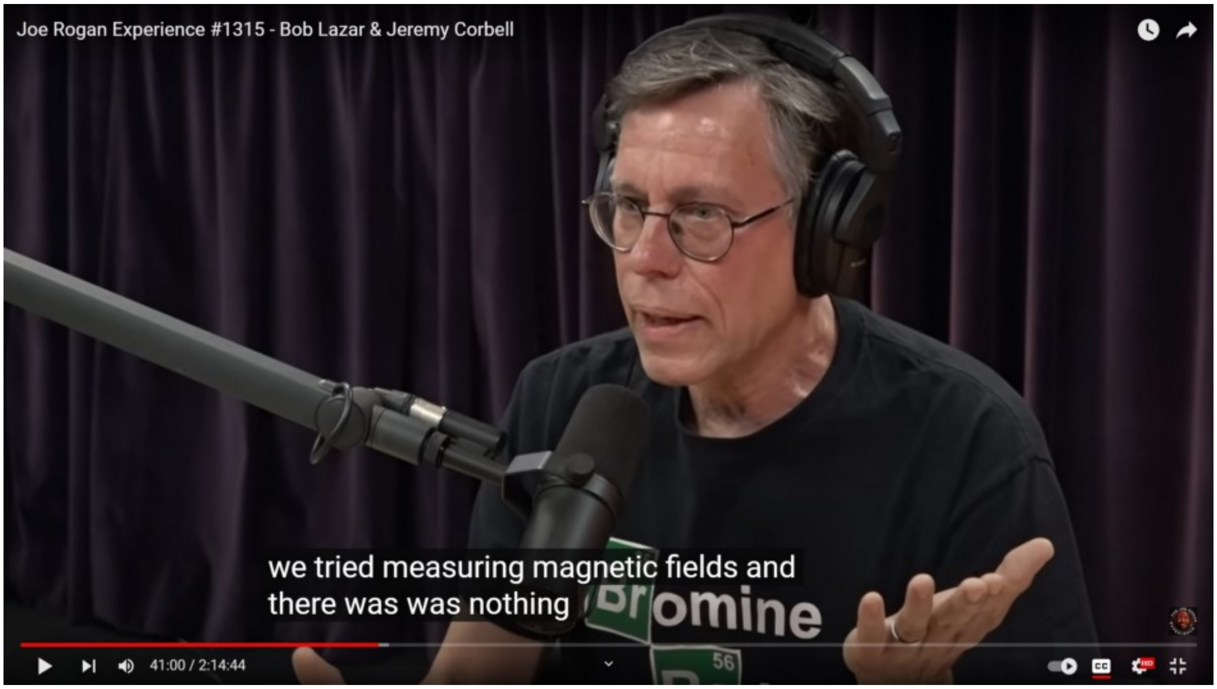
There are two known cases when people put their hands on the materials from flying saucers:

1. In Bob Lazar's story about 9 such crafts parked in Area 51, of which engine reverse engineering Bob worked on;
2. Roswell 1947 UFO crash.

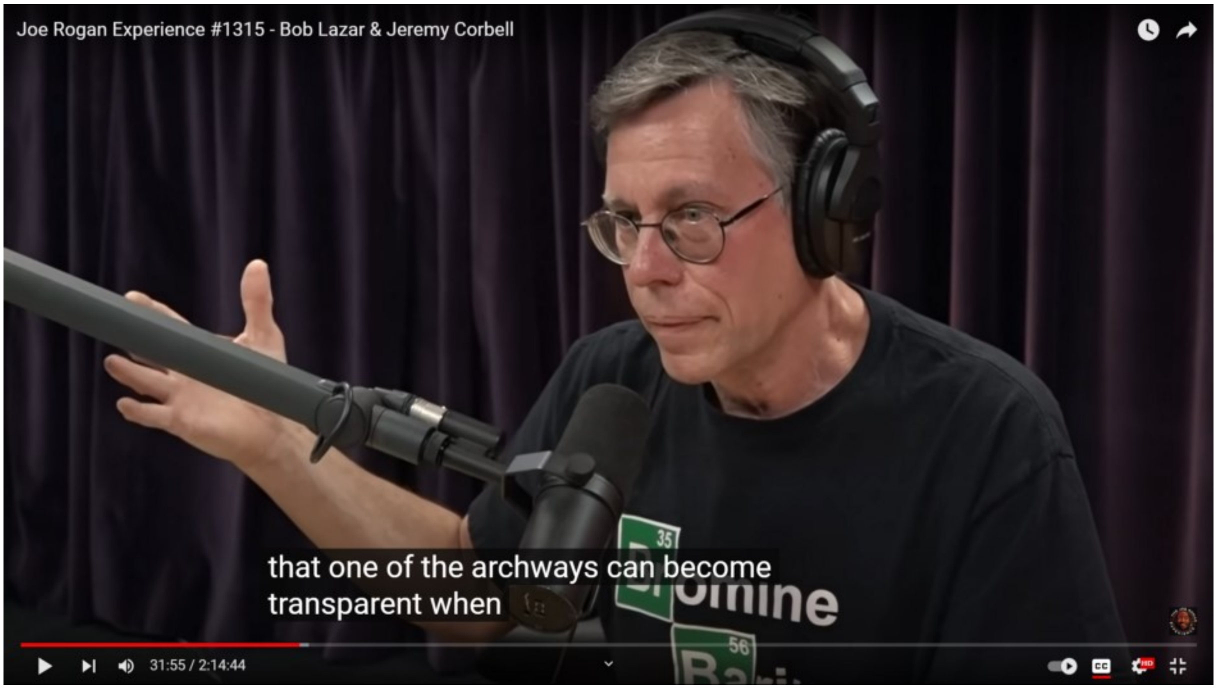
In short, in the case described by Bob Lazar, input/fuel is element 115, and output is slow time around the craft and fast time around the core/reactor. Neither heat nor electromagnetic output has been detected by Bob Lazar's team: https://youtu.be/BEWz4SXfyCQ?t=2445

Joe Rogan Experience #1315 - Bob Lazar & Jeremy Corbell

load was on the reactor it never got
above ambient temperature which

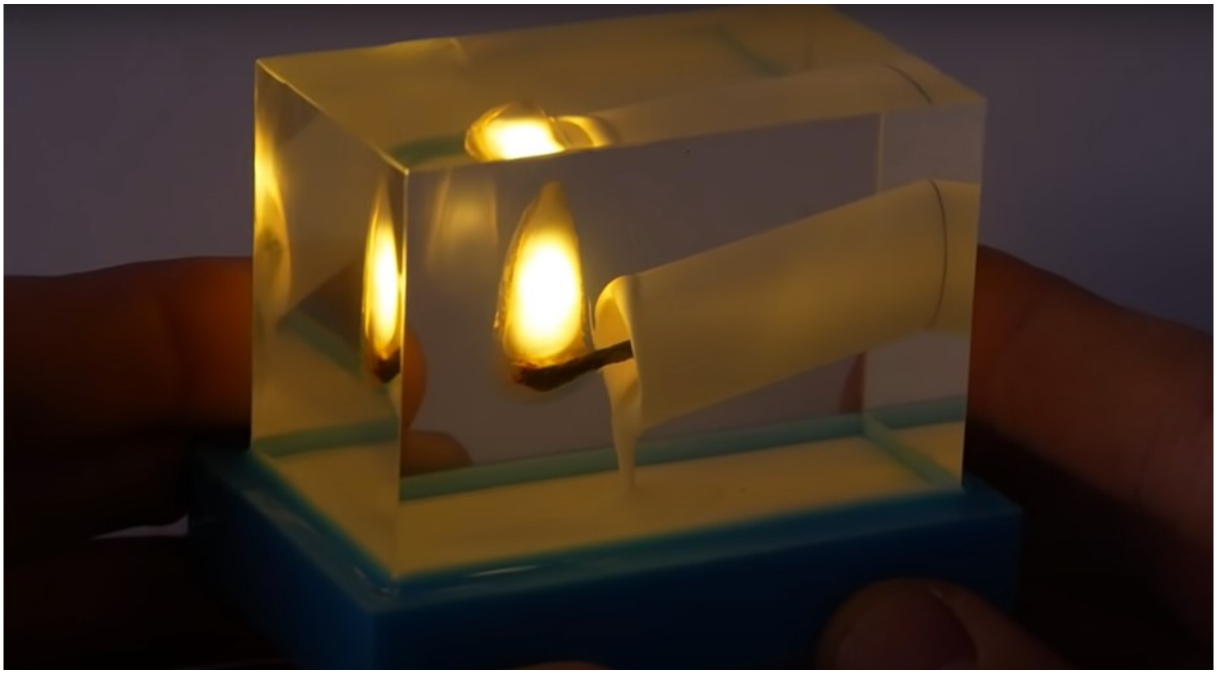

Joe Rogan Experience #1315 - Bob Lazar & Jeremy Corbell
we tried measuring magnetic fields and
there was was nothing
41:00 / 2:14:44

Bob does not know whether the craft body was ceramic or metallic ("materials" team worked on that, and Bob had no direct interaction with them), but he noticed that one archway became transparent sometime:

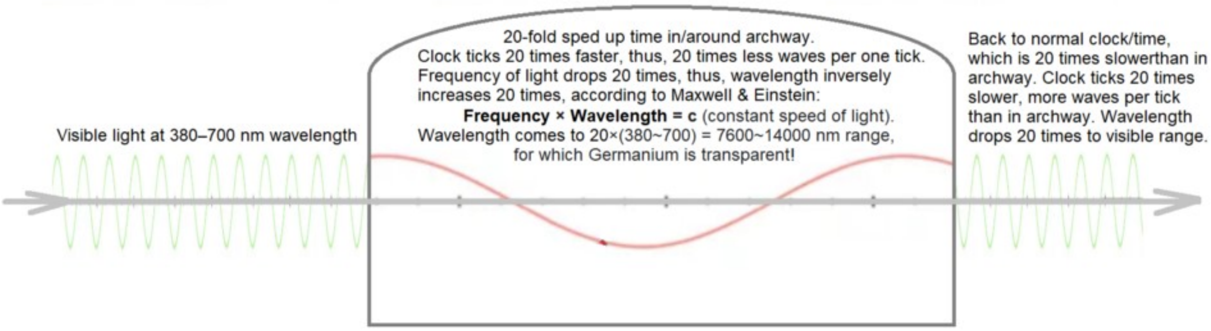

Joe Rogan Experience #1315 - Bob Lazar & Jeremy Corbell
that one of the archways can become
transparent when
31:55 / 2:14:44

https://www.youtube.com/watch?v=BEWz4SXfyCQ&t=1904s

Bob refers to the smart-glass analogy: some natural and some artificial materials become transparent under heat or electromagnetic treatment. But this craft/engine produced neither heat nor electromagnetism. All it was doing is changing flow of time around the craft and accelerating it around the core. That leads us to the materials like Germanium: Germanium lets light in the wavelengths of 8000–14000 nanometers (the infrared) spectrum to pass through and blocks all other light, including visible light, which has 380–700 nm wavelength. Germanium is a metalloid (shares metallic and ceramic properties), similar in appearance to Silicon, which is a more abundant metalloid used everywhere. And there are other materials (alloys, salts, …) that are opaque except for certain light wavelength ranges. Let’s stick to Germanium and figure out how it can become transparent when “time treated”. There is 20-fold (20-times) difference between 380–700 nm visible light spectrum and 8000–14000 nm light spectrum for which Germanium is transparent. We already solved a similar problem in chapter 13 for Bob Lazar’s Frozen Candle:

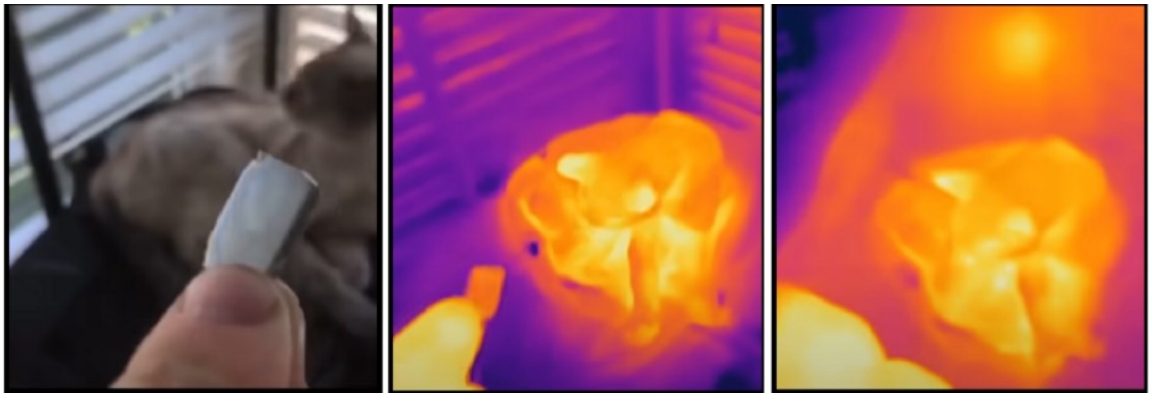


Let’s do it again now for a Germanium wall:


20-fold sped up time in/around archway.
Clock ticks 20 times faster, thus, 20 times less waves per one tick.
Frequency of light drops 20 times, thus, wavelength inversely increases 20 times, according to Maxwell & Einstein:
Frequency × Wavelength = c (constant speed of light).
Wavelength comes to 20×(380~700) = 7600~14000 nm range, for which Germanium is transparent!
Visible light at 380–700 nm wavelength
Back to normal clock/time, which is 20 times slowerthan in archway. Clock ticks 20 times slower, more waves per tick than in archway. Wavelength drops 20 times to visible range.

In the archway light is redshifted (wavelength increases to infrared).

Even with an additional layer of slower time around the craft, a similar solution still works with additional multiplications and divisions on wavelength: in total, it all cancels out, similar to what was explained in the Frozen Candle solution (at the bottom of chapter 13). Total wavelength change from the beginning to the end depends on two factors actually: time speed at the beginning — where light comes or reflects from, and time speed at the end, which is time where observer's eyes are. And both "times" are the same — normal for us time speed. Turning into infrared on its path through the archway (due to time speed change, explained in the picture above) allows this light to pass through Germanium-like wall. And then, infrared light turns back into visible, because time changes back from sped-up in the archway to normal in/around the observer's eyes. That solves the problem. Exactly that happens in the video below: the youtuber presents Germanium piece on the left, then he uses an infrared camera to record how he can see a cat through this Germanium piece. Infrared image of the cat passes through Germanium, and the camera converts it to the light we can see: https://www.youtube.com/watch?v=2MrwOxaeicQ&t=15s



Up until now, we have discussed regular/stable isotopes of Germanium. Our topic changes from now on. I decided to Google "Germanium UFO", to see if there are such findings. The only article I found https://www2.abqjournal.com/roswell/1ros7-25.htm: In 1997, 50 years after the Roswell crash, San Diego chemist Russell Vernon Clark made isotope analysis of the material from that crash. It was 99% silicon, and the rest 1% was split between 2–3 elements, one of which was germanium-75. Here comes the puzzle in his report:

> *Vernon Clark's claim that the alleged 50-year-old spacecraft debris contained a detectable amount of the element germanium-75, a substance so radioactive scientists say it would decay into other elements in less than a day.*

I double checked germanium-75 half-life — it is about an hour (83 minutes, to be precise), meaning that in 24 hours, by the end of a day, it will remain $2^{-20} \approx 1/1{,}000{,}000$ — one millionth fraction of the original material from the beginning of the day. And after 50 years, which equal to 365 × 50 = 18,250 days, for Vernon Clark analysis in 1997, it would have remained $1/1000000^{18250} = (10^{-6})^{18250} \approx 10^{-100000}$ fraction of the original germanium-75 amount from the crash in 1947. Now, germanium-75 atomic weight (75 atomic units) translates into

$$75 \times 1.66 \times 10^{-27}\ \text{kg} = 124.5 \times 10^{-27}\ \text{kg} = 1.245 \times 10^{-28}\ \text{ton}.$$

To have even one germanium-75 atom remained after 50 years, the initial amount of it should have been

$$10^{100000} \times 1.245 \times 10^{-28}\ \text{ton} \approx 10^{99972}\ \text{tons},$$

which outweighs the visible by James Webb Universe. That means zero atoms of Germanium-75 should had been detected by Vernon Clark.

- *Somehow, highly radioactive, with 83-min half-life, Germanium-75 survived 50 years;*
- *Somehow stable element 115 is used in Bob Lazar's craft, despite known 115-isotopes half-life is less than a second.*

For element 115, Bob Lazar suggested that some quantity of neutrons can stabilize it (meaning there might be another stable synthetic isotope than unstable Moscovium).

I suggested another solution: atomic time/clock in stable element 115 atoms is extremely slow compared to our time. That would explain the astronomical amount of energy canned in this fuel as well. You can find details on this in chapter 17.

Any isotope of Germanium has to have 32 protons. Germanium-75 means the total number of protons and neutrons equal 75. Thus, the number of neutrons of Germanium-75 has to be 75–32 = 43, so we cannot stabilize Germanium-75 by changing its number of neutrons. So far, only atomic clock/time dilation can explain Germanium-75 presence in the Vernon Clark’s report. Thus, extreme atomic time dilation solves both element 115 and Germanium-75 puzzles in such crafts. That means time when/where these atoms were created was very slow (details are in chapter 11).

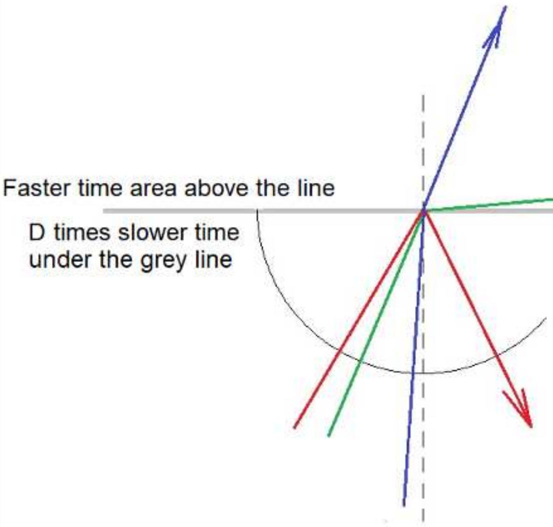
In the next chapter we show that slowing down an atomic clock **100 times** extends the atomic lifetime **10 billion times**, and **1000-fold** slower atomic clock extends life of the atoms **1000 trillion times**. For **Germanium-75 100-fold** clock/time dilation changes its 83-min half-life to **1.5 thousand years**. For **element-115 1000-fold** clock/time dilation changes 0.65-second half-life (measured for the synthetic isotope of element 115, which is called Moscovium) to **20 million years**.

27. EXTRAORDINARY STABILIZING POWER OF TIME DILATION

10-fold dilation of atomic clock increases
the atomic lifetime 100,000 times.

In chapter 26 we discussed element 115 and Germanium-75, which are highly unstable, and the solution for their stabilization via time dilation of the atomic clock. But here is the problem: to make these atoms really stable we need to increase their lifetime dramatically ("half-life" is the official term, which denotes the time period at which half of such atoms decay). Intuition tells us that we need to slow down the atomic clock billion times. But we will see that slowing down the atomic clock only 100 times will increase the atomic lifetime 10 billion times.

In chapter 22 we discussed that any object, which crosses a border between two timezones (meaning in one area time runs D-times slower than in the other area), will receive boost = $c-2c/(D^2+1)$, where c denotes the speed of light. Direction of the boost is perpendicular to the timezone's border. When crossing goes from the faster timezone to the slower timezone, the boost is positive (speed increases, by Einsteinian formula for adding velocities). When crossing goes from the slower timezone to the faster timezone, the boost is negative. But if the object's speed is not enough to overcome the negative boost, then the object bounces back symmetrically at the same speed:



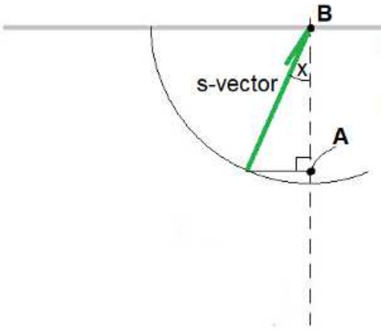
Grey line is the timezone border, under which time dilation is D (the time speed in the area below the grey line is D times slower than the time speed above the line).

Only light or particles at speed near to c (the speed of light) with trajectory close to perpendicular to the border can pass through the border. Otherwise they will be reflected or bounced back.

For the light, it is because of Snell's law for refraction.
For the particles (or objects) it is because of the
$$\text{boost} = c - 2c(D^2+1),$$
which is directed down perpendicularly to the border.

In chapter 18 we discussed that such negative boost manifests as "strong nuclear force" that keeps an atom stable, with all its particles confined. Let's do simple calculations and see how increasing time dilation D inside the atom increases its lifetime:

s-vector is the speed of a particle (for photon or neutrino s = c, otherwise s < c).
x is the angle with the border's perpendicular.
AB is the projection of s-vector on the border's perpendicular.
For the particle to cross the timezone border, |AB| value should overcome
boost = c - 2c/(D²+1) acting in the opposite direction (from B to A).
D is time dilation factor under the grey border, and we are looking at significant D-values.
Boost value is close to c, so should be |AB| (to overcome the boost).
Thus, s should be very close to c and x should be very close to zero.



$|AB| = s \times \cos(x) \approx s \times (1-x^2/2)$

$\text{boost} = c - 2c/(D^2+1) = c \times [1-2/(D^2+1)]$

$|AB| > \text{boost}$, that means:

$s\times(1-x^2/2) > c\times[1-2/(D^2+1)]$

$s/c > [1-2/(D^2+1)]/(1-x^2/2)$

For small x and significant D:

$[1-2/(D^2+1)]/(1-x^2/2) \approx [1-2/(D^2+1)]\times(1+x^2/2) \approx 1-2/(D^2+1)+x^2/2$

Since $s \le c$, $s/c \le 1$:

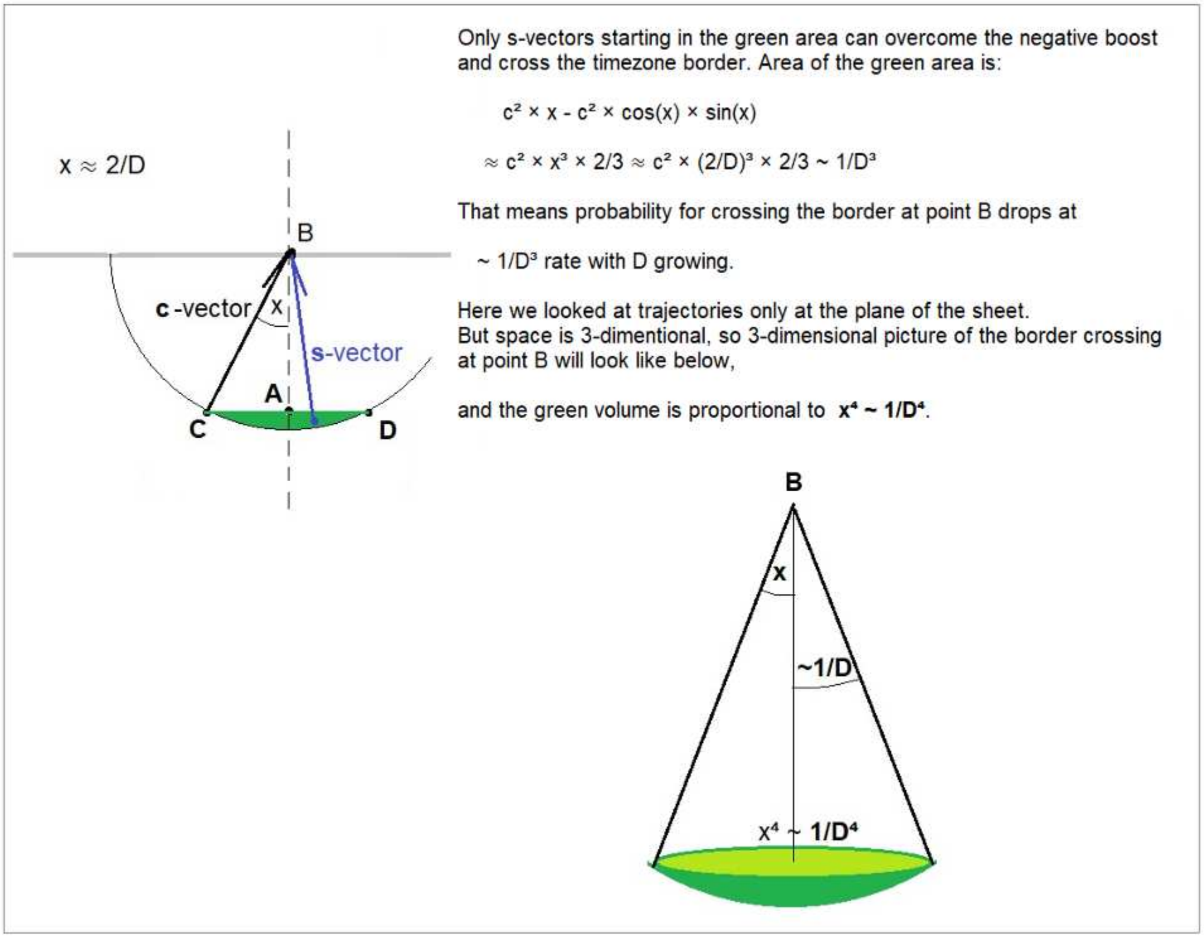
$1 \ge s/c > 1-2/(D^2+1)+x^2/2$

$2/(D^2+1) > x^2/2$

$4/(D^2+1) \approx 4/D^2 > x^2$

$$\boxed{2/D > x}$$

Only particles approaching the border at angle x < 2/D with near-light speed will cross the timezones border. In the picture below, only vectors of speed that start in the green area will cross the border:



Only s-vectors starting in the green area can overcome the negative boost and cross the timezone border. Area of the green area is:

$$c^2 \times x - c^2 \times \cos(x) \times \sin(x)$$

$$\approx c^2 \times x^3 \times 2/3 \approx c^2 \times (2/D)^3 \times 2/3 \sim 1/D^3$$

That means probability for crossing the border at point B drops at

$\sim 1/D^3$ rate with D growing.

Here we looked at trajectories only at the plane of the sheet.
But space is 3-dimentional, so 3-dimensional picture of the border crossing at point B will look like below,

and the green volume is proportional to **$x^4 \sim 1/D^4$**.

Probability of a particle crossing the border at the point B (area/volume of the green zone at the picture above) drops at $1/D^4$ rate with D growing. Now, imagine the border of an atom/nucleus as some bubble wall, and a single nuclear particle bouncing of the walls of such bubble many times within its trajectory. With D growing (time slowing down D times inside the atom), for an external observer's any fixed time period, the corresponding time period inside the atom reduces D times, and so is the path that particle makes over that time period. Thus, **the count** of how many times such particle hits the border **drops D times**. Probability of a particle crossing the atomic/nucleus border drops by D^4 at any single point of the border (see the picture above). On top of that, the number of contact points with the border drops D times (the count of how many times such particle hits the border over the fixed for the external observer time period). Thus, probability of the particle crossing the border during the fixed for the observer time period reduces by $1/D^4/D = 1/D^5$ factor, when D value grows. Probability of particles escaping the atom is the probability of the atomic decay. Because the number of the particles in an isotope is fixed, total probability of some particles escape is still ~$1/D^5$. The isotope half-life (time at which half of atoms of the same type decay) is inversely related to the probability of decay, thus:

Lifetime of an atom increases by D^5 factor,
when time dilation D (inside the atom) grows.

P.S. Besides time dilation, atomic decay depends on other factors as well: number of particles, particle types, etc. But in context of the materials found in flying saucers, resolving D-dependency is enough, as we talk about particular isotopes.

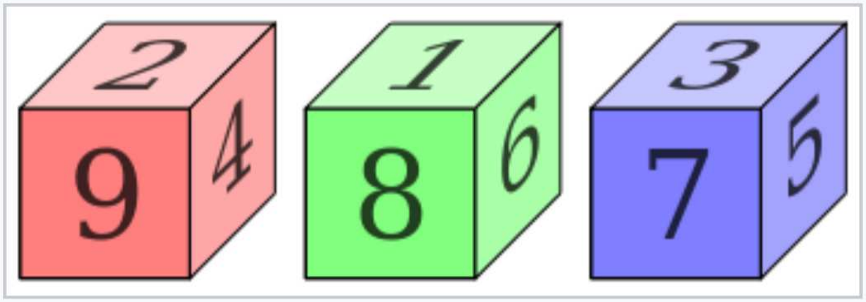
28. GAMBLING AND NOBEL PRIZE FOR PHYSICS

> *"Physics should represent a reality in time and space,*
> *free from spooky action at a distance."*
> *Albert Einstein*

The Nobel Prize for Physics in 2022 made big headlines because it acknowledged that the universe is not "locally real", please check popular talk on YouTube: If "The Universe Isn't Real…" Then What Is It? In short (no worries, we'll make it easy) it is about some statistical inequality (named after Bell) of properties' measurements of so-called entangled particles (which are a particle pair with strongly correlated properties at any time, any distance apart, in any measurement; more details later).

First, let's explore weirdness of statistical inequalities on an interesting gambling example, which seems to violate understanding of our world, but the explanation shows it is real, even for a "common" person, for example, Warren Buffett (see below).

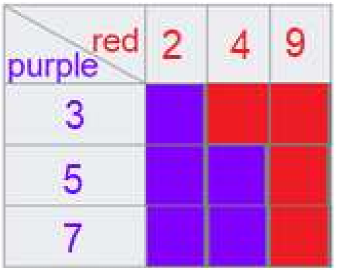
If allow numbers besides 1–6 usual range on a die, then for this specific set of dice



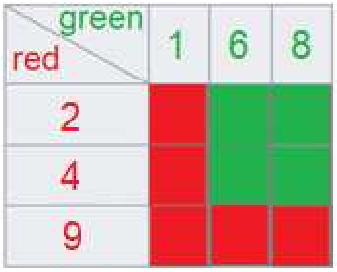
An example of intransitive dice (opposite sides have the same value as those shown).

https://en.wikipedia.org/wiki/Intransitive_dice#/media/File:Intransitive_dice_2.svg

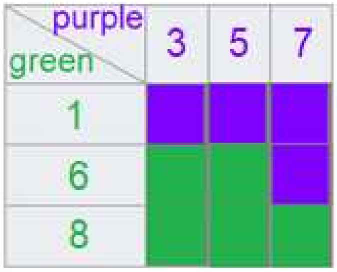
- **purple die beats red die** with probability 5 of 9 (beat means getting a bigger number when rolled)
- **red die beats green die** with probability 5 of 9
- **green die beats purple die** with probability 5 of 9:



red purple	2	4	9
3	🟪	🟥	🟥
5	🟪	🟪	🟥
7	🟪	🟪	🟥



green red	1	6	8
2	🟥	🟩	🟩
4	🟥	🟩	🟩
9	🟥	🟥	🟥



purple green	3	5	7
1	🟪	🟪	🟪
6	🟩	🟩	🟪
8	🟩	🟩	🟩

https://en.wikipedia.org/wiki/Intransitive_dice

For whatever die first player picks, second player can always pick a stronger die of the remaining two to win with probability 5/9. Warren Buffett once attempted to win this game of dice with Bill Gates. If denote statistical strength of a die over another with > sign (for the winning probability, because it is about comparing rolled numbers) we get these inequalities:

purple > red > green > purple

That violates our intuition, because from the inequalities above we have:

purple > … purple

and both **purple > red** and **red > … purple**.

And the 2022 Nobel prize for physics was awarded for a very similar to such gambling case "inequalities violation" by statistics. And both gambling and quantum physics are 100% statistical.

Now, to the entangled, forever (cor)related, particles. Let's unveil the mystery surrounding this concept, which is widely misunderstood, or misinterpreted. Conundrum literally lies in **"forever"**. Let's show that Einstein was right in more than just doubting "spooky action at a distance". Problem and solution to it lies in here: once entangled particles are created/related, each **particle properties never**

change, unless by some brute force applied to any of the particle (but then they are not entangled anymore). Why are entangled particles' properties fixed forever? Proof comes from the discovered by Einstein **time dilation** – time flow is not absolute wherever whenever, it might slow down or speed up somewhere, sometime, outside in space and inside objects or particles:

- **Relativistic time dilation**-time slows down in moving objects, for example, in accelerated particles;
- **Gravitational time dilation**-time slows down near massive objects, for example near the Earth time flows slower by around one billionth rate than it flows far away from the Earth.

If entangled particles’ properties are not forever fixed, then if one of the particles flies/passes near the Earth, and another particle flies far away from the Earth, and later we try to measure their properties at the same time, then it is likely that properties are not correlated anymore, because first particle lived less time (due to time dilation near the Earth) than another particle. You might object: we should not use external for particles time (to decide on when to measure at "the same time"), but we should use internal time of the particles instead. But then again, if one of the particles on its trajectory to the measurement site was accelerated, even temporarily, then it lived less by internal time (due to relativistic time dilation) than the non-accelerated particle from the pair. We have just proved that particles cannot be measured at the same time, because there is no “the same time”. Thus, their properties are not correlated anymore at the measurement point (unless properties are fixed forever).

Universe is full of time discrepancies, with even more cases than relativistic and gravitational. And time speed changes not only from an area to another area, but time speed changes in the same area with time, that means **time is local** – local to both space/area and time/moment. To summarize, we used locality of time to disprove that “universe is not locally real”.

P.S. **Forever fixed properties of particles** explain previously misunderstood and misinterpreted results of a second measurement of a property (called "spin") for the same particle/s (we are not even talking about entangled pair):

- If the second measurement is done in the same direction/plane (of the magnetic field that performs the measurement/filtering) as is the first measurement, then result is always the same as in the first measurement;
- If the second measurement is done in another direction/plane than in the first measurement, then result of the second measurement is random again.

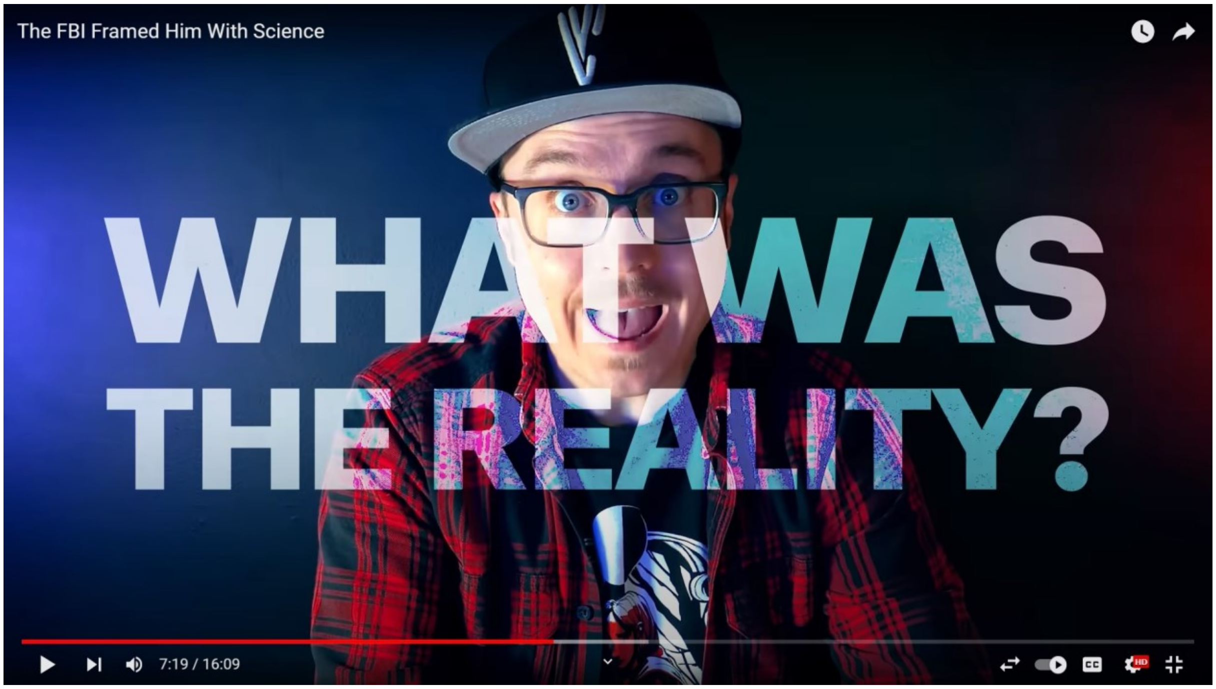
Previously, it was interpreted as a "collapse of the probability (wave function)" only in one direction/plane, but not in other planes-and such interpretation should have raised a red flag. Now, with our forever fixed properties (but varying in plane / direction, i.e. spin property is multi-dimensional in nature) of particles explanation, we understand why a measurement for the second particle, if taken in the same plane/direction as for the first particle in an entangled pair, produces a constant result, irrespective to the time of the second particle measurement-it is always opposite (that is why called correlated) to the first particle property, and properties of each particle are fixed forever (until some force applied). Now, to why it is not so different from our macroworld:

> *Some particle properties, "spin" for example (popularly called up-or-down property), is not a single value per se, as its value depends on the direction of measurement. It is like the "fluffiness of a hairy toy" property — hairs point in various directions all over the toy: in some places hairs are more up than down and vice versa. And the way to change hair direction is by touching them, i.e., by applying some force. The toy's hairiness/fluffiness/shape does not change over time by itself (even gravity or decay is a "force"). The same is observed in the microworld — particle property depends on the direction of measurement, but not on the time/moment of measurement. That means, if the measurement device and the particle do not rotate relatively to one another, then the result of a measurement for that particle is always the same over time. For an entangled particle, a property was measured twice: for the particle itself and for its twin.*

And if neutrino fluctuation in time raises a doubt, then check chapter 6, where misinterpretation of that is resolved.

P.P.S. Come out with a verdict:

- Texas Sharpshooter Fallacy
- Multiple Comparisons Problem
- Apophenia
- Confirmation Bias
- Cherry Picking the Truth



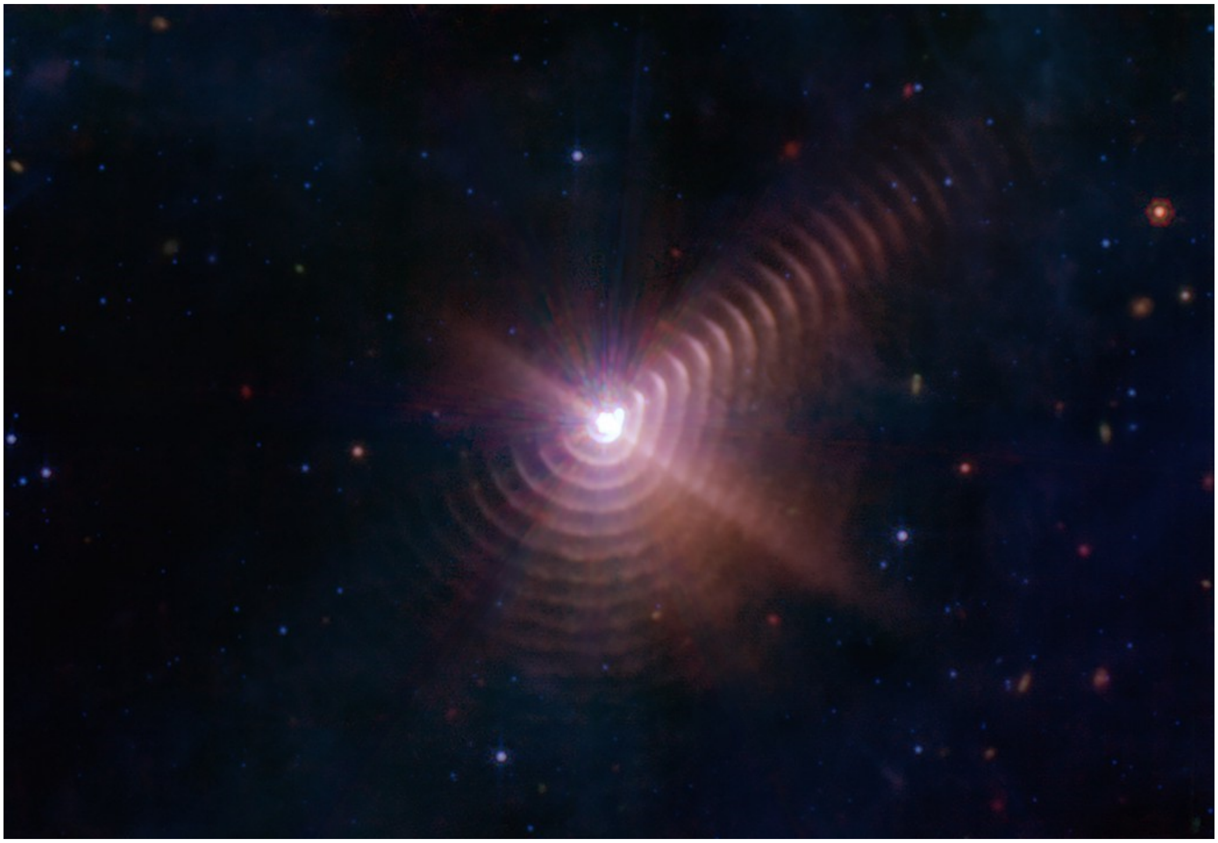
https://www.youtube.com/watch?v=C2jaIrbqzEo

29. TIME = AETHER / ETHER FOR REAL

Wikipedia*: In physics, aether theories (also known as ether theories) propose the existence of a medium, a space-filling substance or field as a transmission* ***medium for the propagation of electromagnetic or gravitational forces****. Since the development of special relativity, theories using a substantial aether fell out of use in modern physics, and are* ***now replaced by more abstract models****.*

Then why reraise this old topic, when Einsteinian **abstract** 4-dimensional surrogate of 3-dimensional space and 1-dimensional time is such a good **model?** In pages 76-79 of this book, real time was explained as quantum fluctuations, and time as a scalar (not dimensional) property of space, as its speed is local to space/area and to time/moment. Now the abstract/mathematical Einsteinian gravity becomes materialistic as a push from quantum fluctuations, and the Newtonian search for the gravitational Agent is over. And no Dark Matter is needed to solve the propulsion of our Milky Way (Vera Rubin's puzzle for spiral galaxies). Thus, **time is the medium** for gravitational forces. Then what about a **medium** for electromagnetism? So far

Maxwellian abstract/mathematical equations assume two density constants (electric and magnetic densities of space), and he derived the speed of light constant from these theoretical density constants. But is the speed of light really a constant?
As **time speed** (which is the length/duration of a second) is variable, the variability of light wave propagation distance per second (in m/**sec**) is hidden inside the variability/locality of a second. That explains time density (speed or time dilation in an area) as a real implementation of Maxwellian abstract **electromagnetic density of space**. Time locality translates into differences of light propagation distances. That explains not perfectly rounded/spherical corona in this star image, taken by JWST:



https://www.nasa.gov/feature/jpl/star-duo-forms-fingerprint-in-space-nasa-s-webb-finds

For more explanation on such optical effects check Misinterpretation of James Webb Images, Again.

30. REFRIGERATOR IS IMPOSSIBLE BY THERMODINAMICS!

Recently I received a lot of feedback stating the UFO impossibility by the laws of physics. Here I summarize my responses:

Two centuries ago, all but a few laughed at the fridge idea, because it violates equilibrium: “Pumping heat from a colder place to its warmer ambient!?” The same people would have laughed now at the impossibility of a fridge: “It is real!”

WHAT'S INSIDE?

Now to gravity. It is caused by time dilation (variability of time flow): time near the Earth flows at about one billionth rate slower than away from it, and such time difference weighs a lot to us (according to Einstein). Let’s compare our knowledge of time and temperature side by side:

- Time is as real as Temperature is.
- Physically, Time is Quantum fluctuations, and Temperature is Brownian motion.

- Bob Lazar’s craft operates by altering flow of time (by speeding time inside the craft and slowing it around the craft). Fridge lowers temperature in its chamber by pumping heat out.
- Bob Lazar’s gravitational engine core plays the role of a fridge compressor.
- Bob Lazar’s element 115 plays the role of Freon (which makes the fridge possible).

It took more than a century after the steam engine invention for the refrigerator to be invented. Right after the fridge invention, thermodynamics pronounced itself into existence. Is it any different now with Bob Lazar's craft?

WHAT’S INSIDE?!

31. REVERSE ENGINEERING “UFO’S REVERSE ENGINEERS”

We already figured out the physics of all effects Bob Lazar had described. And it was just an application of the physics we developed for the Universe (in chapter 1) and our Milky Way (in chapter 2) rather than developing it from scratch for UFOs. Chapter 30 switches focus from science to engineering. And the bottleneck for this craft reverse engineering is element 115 availability. According to Bob Lazar, there was 500 lb of this element in area 51, and the craft Bob Lazar described was loaded with 0.5 lb of it. Reverse engineers should either figure out 1) What material can substitute it? Or 2) Where to mine it?

1) In the **interview with Dr. Teller** (the Hydrogen bomb lead scientist), a question was raised about whether heavy elements like Plutonium or Uranium could be a substitute. Let’s quickly discuss why such substitution won’t work.

Element 115 contains very slow time inside — and that slow time is scaled up around the craft to counter gravity. Slowness of time (time that is **D** times slower than our time speed) makes this element stable (otherwise it lives less than a second) and concentrates huge amount of energy in 0.5 lb fuel for the craft, because according to the modified Einsteinian formula for energy (in chapter 20), the energy is multiplied by $\mathbf{D}^2$: $E = mc^2\mathbf{D}^2$. How energy is consumed from the fuel: Initial energy has some big value of **D**, where $E = mc^2\mathbf{D}^2$. As energy is being consumed, the values of both E and **D** go down.

There is a known synthetic isotope of element 115 called Moscovium. It has a half-life of 0.65 second. If we have time dilation **D** = 1000, then element 115 will have a half-life of 20 million years (explained in chapter 27). It is because lifetime of the element is proportional to $\mathbf{D}^5$. And if time dilation **D** drops from 1000 to 100 then lifetime of element 115 will drop 10^5 times to 200 years. Physicists can calculate that 0.5 lb then will explode like a fission bomb. I took initial time dilation **D** =1000 as an example, but it is known that time in some cosmic ray particles can be dilated with **D** > 1,000,000,000.

Now, can Uranium or Plutonium serve as a substitute for element 115 fuel? Plutonium won’t work because it is already highly radioactive. Depleted Uranium U-238 has a lifetime (which in physics is called half-life) of 4.5 billion years. Uranium-235, which is used in fission bombs, has a lifetime of 700 million years, and its critical mass for fission reaction is 104 lb. When energy E is being spent, time dilation **D** decreases (time speeds up) and atoms become less stable (details are in chapter 27). If time speeds up 10 times inside these atoms, then either lifetime or critical mass will go down 100,000 times, and this fuel will radiate or blow up — no different from Plutonium.

Because of that, substitutes available in the Earth crust (with low time dilation **D** factor) are extremely dangerous.

2) Where to mine element 115?

In chapter 24 we explained that there is neither event horizon nor black holes. By the Eric Lerner term, there are “nearly black holes”: dense/heavy non-ignited stars. They are not ignited for the same reason why fusion or fission is suppressed due to very slow time. Thus, these “nearly black holes” are the best candidates for mining: the heavy elements with very slow time inside should be available on “nearly black holes” surface.

So, a plan for the reverse engineers could be: having an alien craft and having initial 500 lb fuel, travel to some of these “nearly black holes” and mine there. Luckily, this kind of craft creates an antigravity envelope around itself, which allows it to land on a “nearly black hole”. And luckily, there is no event horizon, which prevents travelling back. And luckily, this technology can cut through any material (chapter 22).

P.S. Bob Lazar was told that these crafts came from some archeological site. As this technology counters gravity and cuts through / evaporates any material, it is a perfect technology for carving hard stones and transporting them. It could be used for megalithic architecture found in the Middle East and in Egypt. Maybe some ignorant users of this technology used element-115 fuel beyond its stability, element-115 became unstable and killed the craftsmen by radioactivity or by an explosion. And the civilization, which inherited and used this technology, ended.

P.P.S. We are next users, and we are aware of the fission danger.

32. GIFT FROM ZETA RETICULI

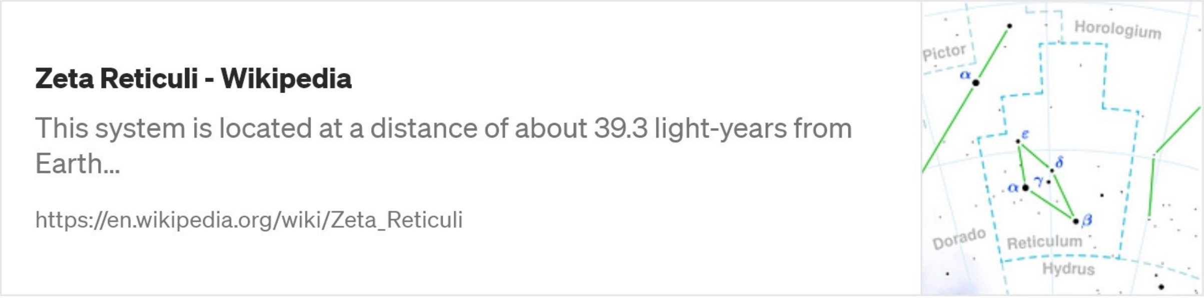
> *"So, there was some paperwork that indicated that this was from the Zeta Reticuli star system. Now, how they obtained that I haven't a slightest idea. That was printed in the same materials that referenced the reactor."*
>
> *Bob Lazar*

Joe Rogan Experience #1315 - Bob Lazar & J...

Area 51 • Area 51, secret U.S. Air Force military installation located at...

https://www.youtube.com/watch?v=BEWz4SXfyCQ&t=1212s

Details on Zeta Reticuli system can be found in Wikipedia:

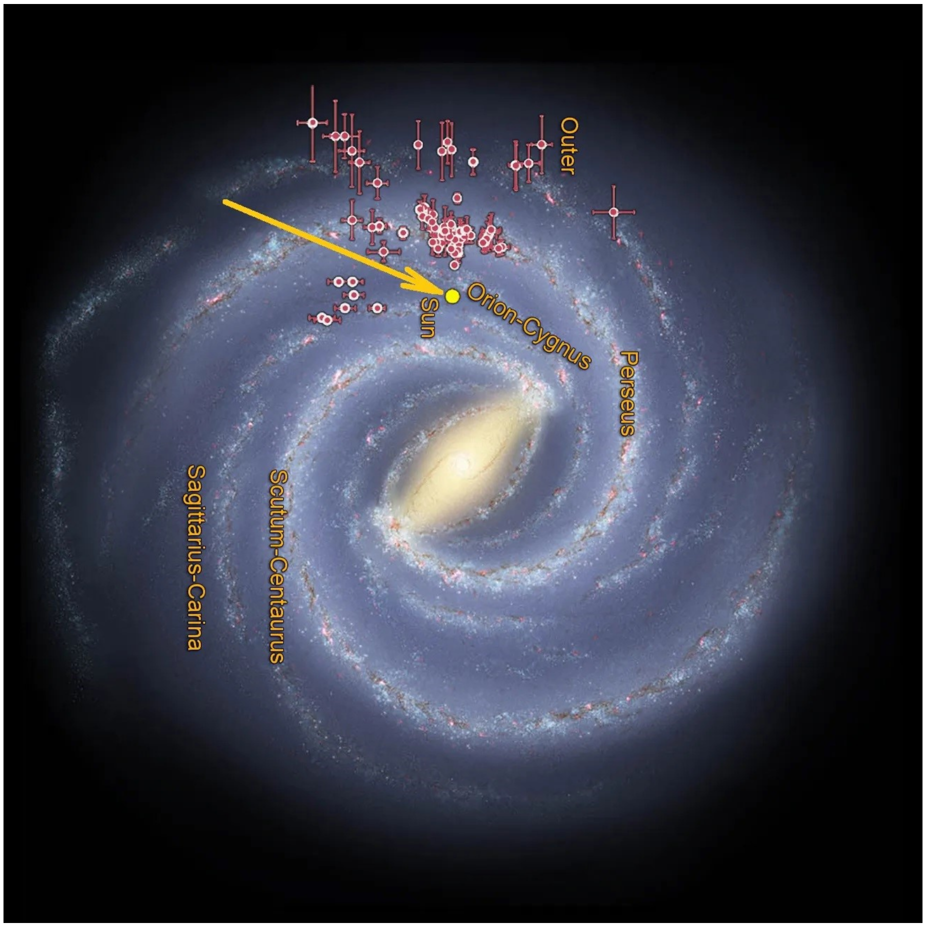


Zeta Reticuli - Wikipedia

This system is located at a distance of about 39.3 light-years from Earth...

https://en.wikipedia.org/wiki/Zeta_Reticuli

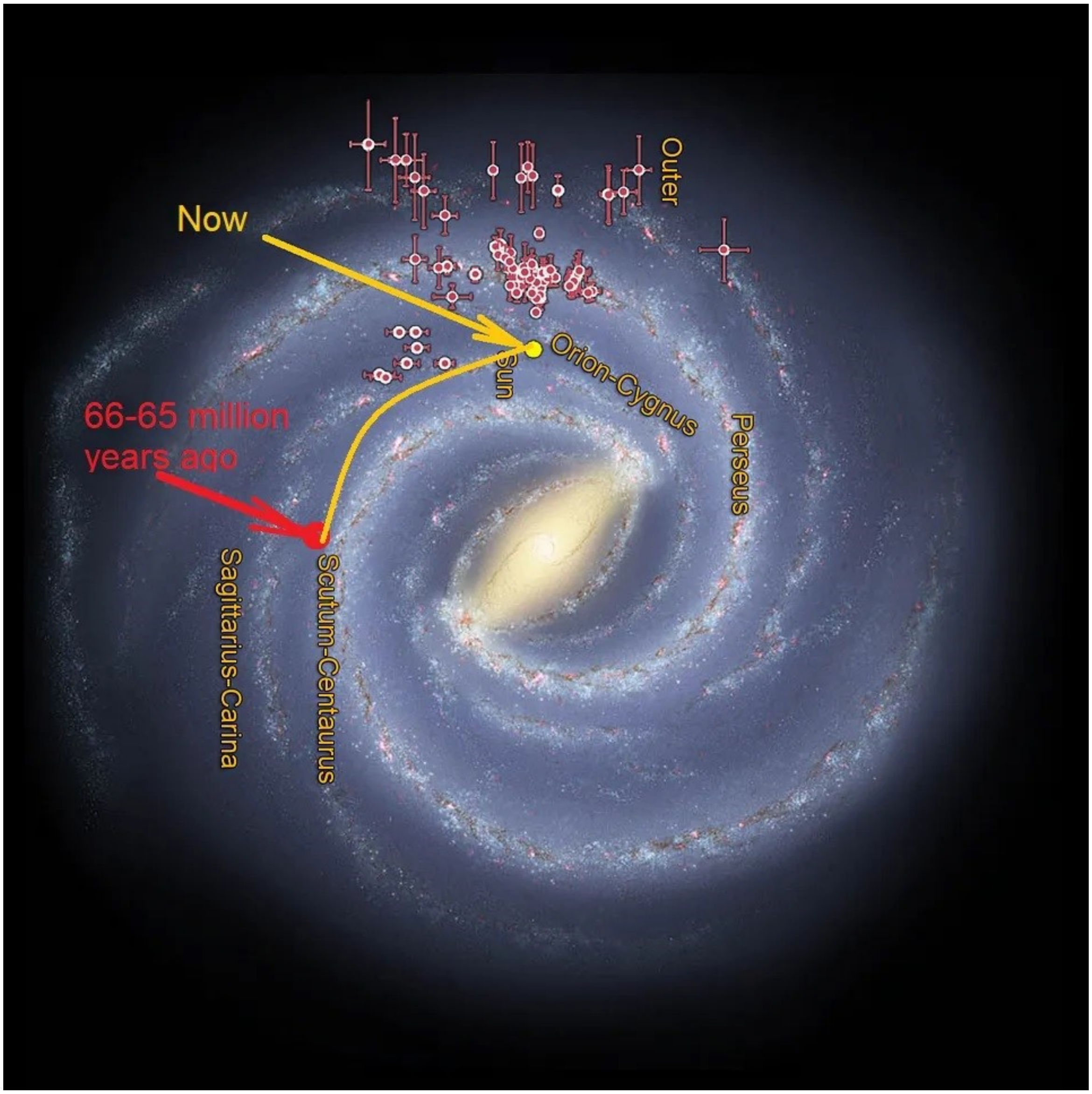
Zeta Reticuli system is at about 40 light-years from us. Light-year (abbreviated as **LY**) stands for the distance that light travels in a year (at the speed of about 300,000 km/sec). Here is our Milky Way map with the current position of our Sun:



Wikipedia: The Current Sun Position in The Current Milky Way

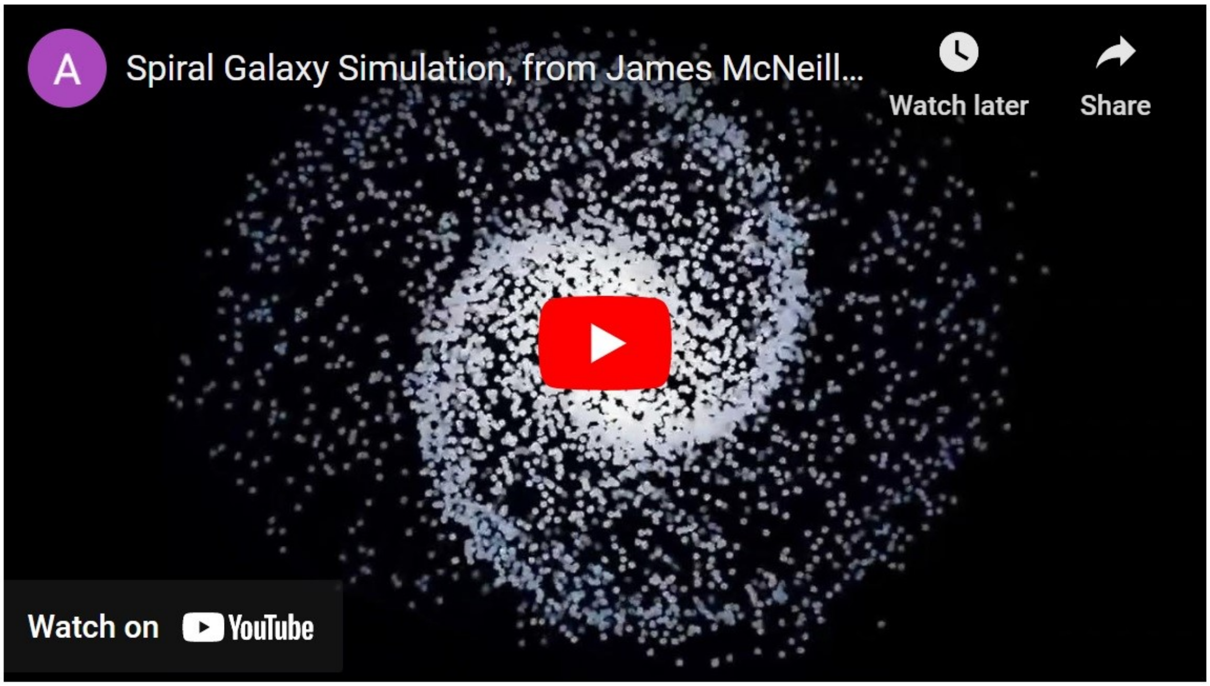
Now, to understand the scale, diameter of Milky Way is about **100,000 LY**, and the map above has a width of about **1,000 px**, that gives the map scale: **1px = 100 LY.** The yellow spot's size is about 20 px in diameter, which translates into 2,000 LY. Of course, our Solar system is thousand times smaller than this, and our Sun is billion times smaller, as **the yellow spot covers our neighborhood of about 1,000 LY radius**. And Zeta Reticuli, which is 40 LY from us, is definitely inside that yellow spot. There are plenty of interesting stars inside the yellow spot: for example, the oldest known star in the Milky Way, Methuselah's Star, which is 3 times older than our Sun, and is only 200 LY away from us.

Now, besides distances in LY (and in px on the map), we need to understand distances in time. Milky Way stars rotate at a speed in the range of 220–330 km/sec, that is about 1,000 times less than 300,000 km/sec speed of light. For example, our Sun needs 1,000+ years to cover 1 LY distance. 66–65 million years ago, when dinosaurs went extinct, our Sun was at 9 o’clock position on that map, leaving Scutum-Centaurus arm:



Sun Left Scutum-Centaurus Arm 66–65 million Years Ago

And velocities (by absolute value and direction) of stars change like in this computer simulation:



https://youtu.be/6Xy1CMrxLkI
James McNeill: http://playtechs.blogspot.com/2010/04/spiral-galaxy-hack.html

Now, we have a big picture, and we can see that our Sun spent the last million years inside the yellow spot, inside which was and is Zeta Reticuli as well. Now, let's zoom into the latest time. Current distance between the Solar and Zeta Reticuli systems is 40 LY, and both systems move in about the same direction, so with speed range for each system at about 1/1000 the speed of light, the speed at which they recede from each other is less than 1/1000 the speed of light. That means, even if Solar and Zeta Reticuli systems some time back were very close to each other, it was more than 40,000 years ago, perhaps closer to 100,000 years back. For astronomers, who have modern observation tools and powerful computers, figuring out Solar and Zeta Reticuli trajectories for the last 100,000 years should be a doable task, just like figuring out connecting flights for a vacation trip is doable for us. Figuring out current receding speed by Doppler effect should solve this, and then we can look deeper - 1,000,000 years back.

That would connect the dots in the human history:

- Megalithic (of 100–1000 ton stones) architecture in Middle East and predynastic Egypt;
- Dynastic Egypt sculpturing in granite and diorite (with the hardness of 8 out of 10);
- Archeological finding of these flying saucers crafts (as Bob Lazar was told).

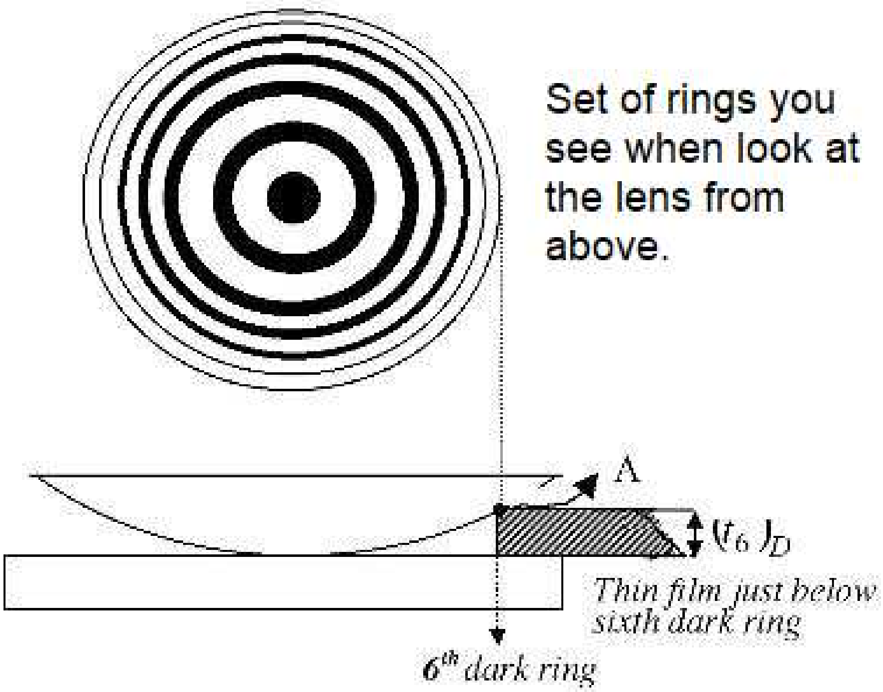
Stone Cutting Techniques & Technology Used...
STONE CUTTING TECHNIQUES & TECHNOLOGY
OF THE ANCIENT WORLD
Watch later
Share
Watch on YouTube

https://youtu.be/0CeKA8_X0DA?t=6442

33. NEWTON'S RINGS TEACH US A LOT, ESPECIALLY NOW

The first time I heard about **Newton's Rings** when I was in high school and my physics teacher demonstrated this experiment:

A lens, flat on one side and convex on the other, is laid down on a horizontal metallic mirror with its convex side down. When monochromatic light is shined from above this lens, we will see an interference pattern: black spot at the center, then interchanging bright and dark circles around:


Set of rings you see when look at the lens from above.
A
$(t_6)_D$
Thin film just below sixth dark ring
6^{th} dark ring

https://www.linsgroup.com/Physics/Physic_Pic1.jpg

My school teacher's explanation was:

Light is an electromagnetic wave, and it is partially reflected back from the convex surface of the lens, and the rest of it reflects from the mirror, and these two reflected waves either cancel each other, due to the difference in waves' phases caused by the gap between the lens and the mirror, or they reinforce each other, where phases are almost the same.

I then asked my teacher:

Why is the center of the corona black? Shouldn't it be the brightest spot because at the center, where the lens touches the mirror, the gap between the reflecting surfaces is close to zero? So, the phase of the light when it reaches the convex lens surface is almost the same as when it reaches the surface of the mirror, right?

Newton's Rings image was exactly opposite to my teacher explanation, which would have led to a bright in its center corona. Neither my teacher nor the school book had an answer. And there was no Internet back then. I got an explanation from a university physics professor a month later:

- *When light reflects from an optically thinner medium (in this case, light is reflected from an air bordered with the convex side of the lens), the phase of the light does not change.*
- *When light reflects from an optically denser medium (in this case, light is reflected from the metallic mirror bordered with an air), the wave changes to the opposite, meaning phase shifts half wavelength.*
- *Thus, reflected waves cancel each other when there is almost no gap between lens and mirror (their phases become opposite).*

Some lessons from this story:

Lesson 1. If you don't have a critical mind, you not only miss something important, but even if someone points you to it, you will accept any wrong explanation (like the rest of my class did).

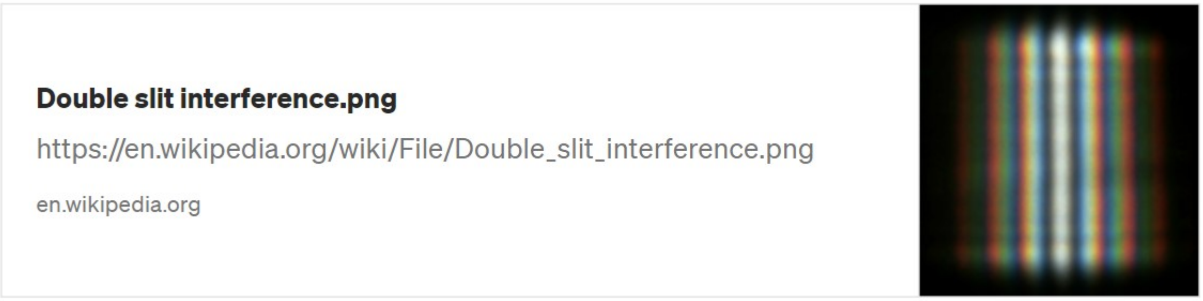
Lesson 2. Not understanding the matter of the subject does not prevent you from teaching or lecturing others (like my school teacher did).

Next simple lesson can be learned from the origin/history of this discovery. Such rings interference pattern was discovered by Robert Hooke and published in 1665 in his popular book Micrographia, of which Newton had an annotated copy. But why then Newton's and not Hooke's rings? Sources say that Newton was impressed by Hooke's work, and he studied light properties himself, but only after Hooke's death Newton published his research on this subject. But here is another strike: Newton favored a corpuscular nature of light, and Hooke favored a wave-like nature of light.

And Hooke's point was more appropriate within that experiment's context (though, according to Richard Feynman, it is impossible to explain in a classical way, as it has quantum mechanics in its heart). Attributing this discovery to Newton and not to Hooke teaches us:

Lesson 3. Authority and supremacy play a significant role in both physics and history.

Another well-known light interference experiment is Double Slit experiment. Although Double Slit experiment is 200-year-old, its major conceptual misinterpretations are less than a century old. Let's start from "observation destroys interference pattern" ("observation impacts quantum world"). Monochrome light coming through two slits creates an **interference pattern** on the screen behind:



Double slit interference.png

https://en.wikipedia.org/wiki/File/Double_slit_interference.png

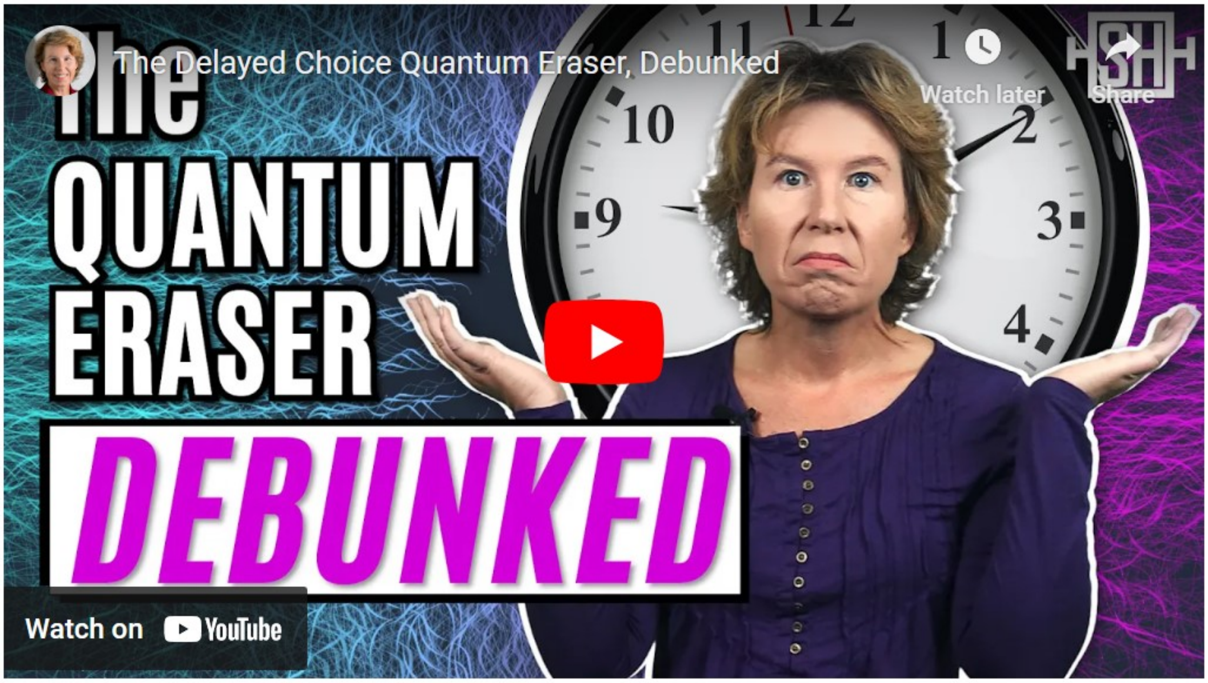
en.wikipedia.org

*But when a **detector** is set before or after one or both slot(s) to identify which way light (photon or a particle) goes through, **no interference pattern is observed**, only two bright stripes on the screen against the slits.*

What we learned about Newton's Rings can explain interference pattern destruction even before diving into quantum mechanical concepts like "wave function collapse". In Newton's Rings and Double Slit experiments monochromatic light is used and interference pattern is observed. That hints at a phase-like explanation. Any measurement device measures by probing a particle or a wave, while it passes through, and by doing that, it distorts the phase of the wave where it is measured, and the wave becomes out of sync (random) in comparison to the other part of the wave, which comes through another slit. Because of that measurement/disturbance, pattern disappears, and the image on the screen looks like if it is produced by two not correlated sources. So far, nobody has invented a non-disturbing/non-interacting measuring device: detectors are electromagnetic in nature (and light is electromagnetic as well). Lesson learned:

Lesson 4. Observation/probing distorts an experiment.

Physicists worked even further around detection/measurements for the Double Slit experiment. The most stunning was the so-called “quantum eraser” setup/observation/claim about “future rewriting/influencing past”. Please watch



https://youtu.be/RQv5CVELG3U

which teaches us next lesson:

Lesson 5. Some scientists will omit detail or two and ignore empirical evidence contradicting their theory/speculation/project/funding.

Such ignorance (or even deception sometimes) might work for a while, as we learned in lessons 1-3. Kudos to Sabine Hossenfelder for calling this misinterpretation out. I wonder how such callouts are met by the mainstream.

Last but not least, the 2022 Nobel Prize for Physics about entangled particles’ measurements led to another extraordinary claim: “Universe is not locally real”. In **"Gambling and Nobel Prize for Physics"** chapter we disproved this unrealistic claim by using locality of time. Next lesson comes from that and many other Nobel prizes:

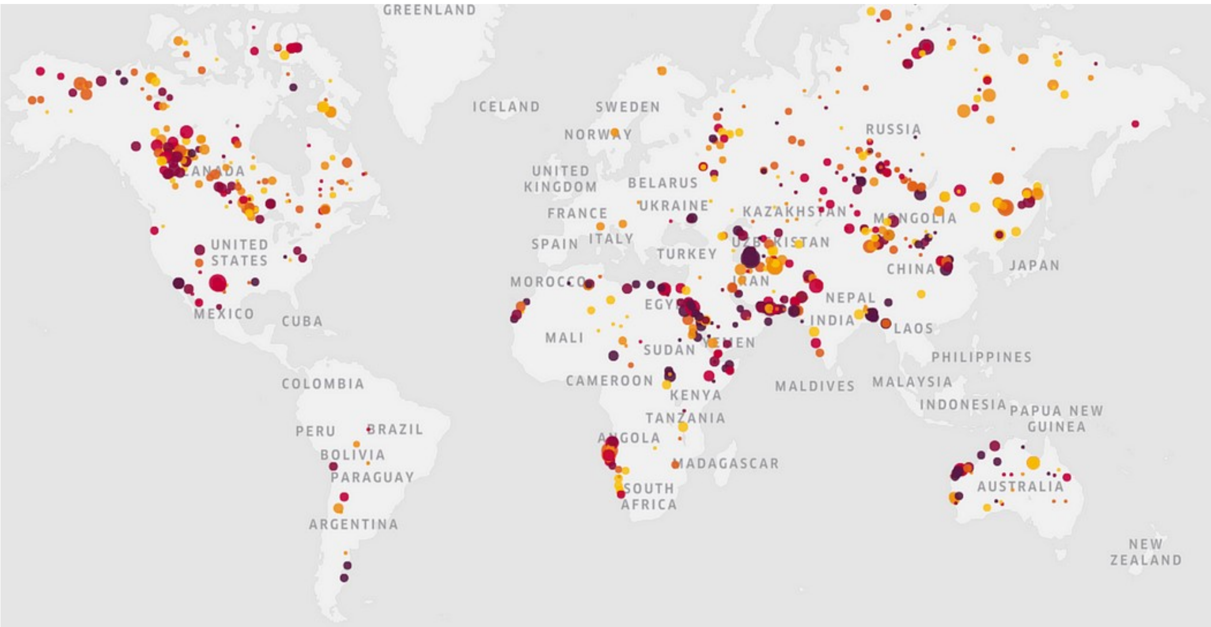
> **Lesson 6. Nobel Prize award does not make the research valuable and the scientists right. It is just a "top of the mainstream" tribute.**

34. EGYPTIAN PYRAMIDS START MAKING SENSE

I came across a remarkable explanation from Geoffrey Drumm on YouTube of the Egyptian Pyramids' purpose. He nailed it! In short, each pyramid was a chemical plant, and various pyramids produced various chemicals. For example, he suggests that the Red Pyramid was built as a plant that produced ammonia from methane and nitrogen by a process, for which Fritz Haber was awarded a Nobel Prize about a century ago.

The Legacy of Fritz Haber: Who Fed Billions and Killed Millions

Arguably, for agriculture and for our civilization it was one of the most important inventions. Ammonia is the main component for soil fertilization. For Egypt, since predynastic civilization, this product was as important as it is for us since the 20th century. Geoffrey Drumm compares chambers in the Red Pyramid and in Fritz Haber's process, provides chemical analysis of residues in those chambers, discusses pressure and temperature conditions for chemical processes. Pyramids retain gases and water in tunnels and chambers under high hydraulic pressure needed for chemical reactions. Geoffrey Drumm suggests that the main source of methane was cured manure. But in my opinion, the source could be the same as it is today — natural gas (which is easier to handle in tunnels). According to European Space Agency, Egypt, especially in the Nile area, emits a lot of methane:



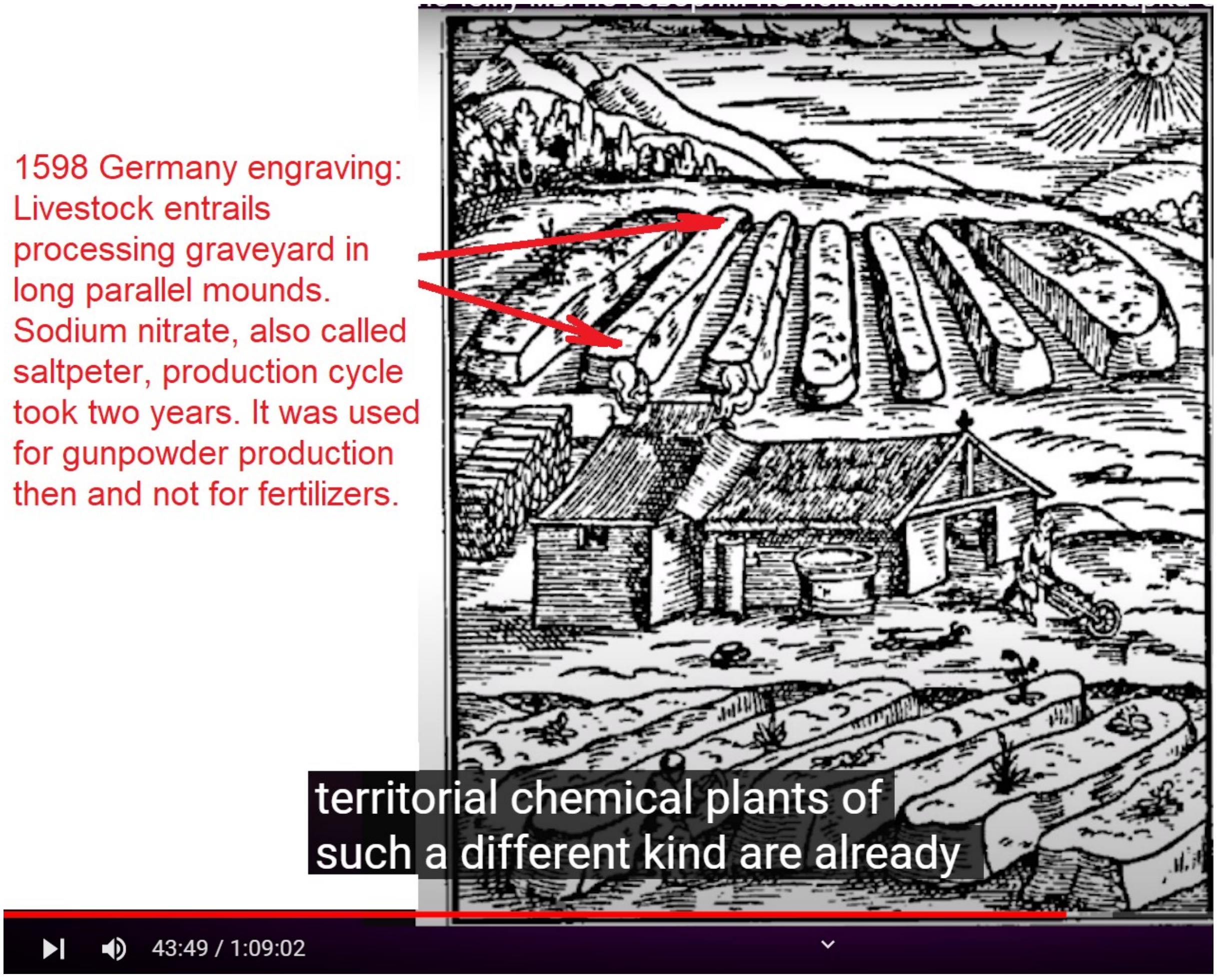
https://www.esa.int/var/esa/storage/images/esa_multimedia/images/2020/05/sample_of_abnormal_methane_concentrations/21992546-1-eng-GB/Sample_of_abnormal_methane_concentrations_pillars.png

Natural gas often is trapped in caves and comes out through Earth cracks. Egyptians would need some construction to gather it from gas wells and route to the pyramid/processing plant. And something like that has been known since ancient time and was recently confirmed:

https://www.youtube.com/watch?v=PADK6Qq2hgk&t=1020s

Flinders Petrie in his books described a grid-like structure of labyrinths covering a vast area and filled in with stone chip stratum. Such a porous structure could collect methane, which then could travel through some tunnels to the pyramids. Check Geoffrey Drumm’s channel [The Land of Chem] for the suggested timeline — from pre-dynastic Egypt, when these plants were built, to dynastic Egypt, when these constructions were reused. For example, during the 12th Dynasty that labyrinth was repurposed for something less advanced.

Tremendous efforts for building a pyramid as a tomb for a dead man, whose corpse was not found inside, never made sense. That reminded me of real graveyards used for nitrates production in Europe in 16th century at industrial scale:



1598 Germany engraving: Livestock entrails processing graveyard in long parallel mounds. Sodium nitrate, also called saltpeter, production cycle took two years. It was used for gunpowder production then and not for fertilizers.

territorial chemical plants of
such a different kind are already

https://youtu.be/ADanNowjQKg?t=2606

I strongly agree with Geoffrey Drumm's conclusions. As a physicist, I have a different opinion from Geoffrey's on tools used for stone cutting and transportation, but that does affect the "pyramids as chemical plants" explanation.

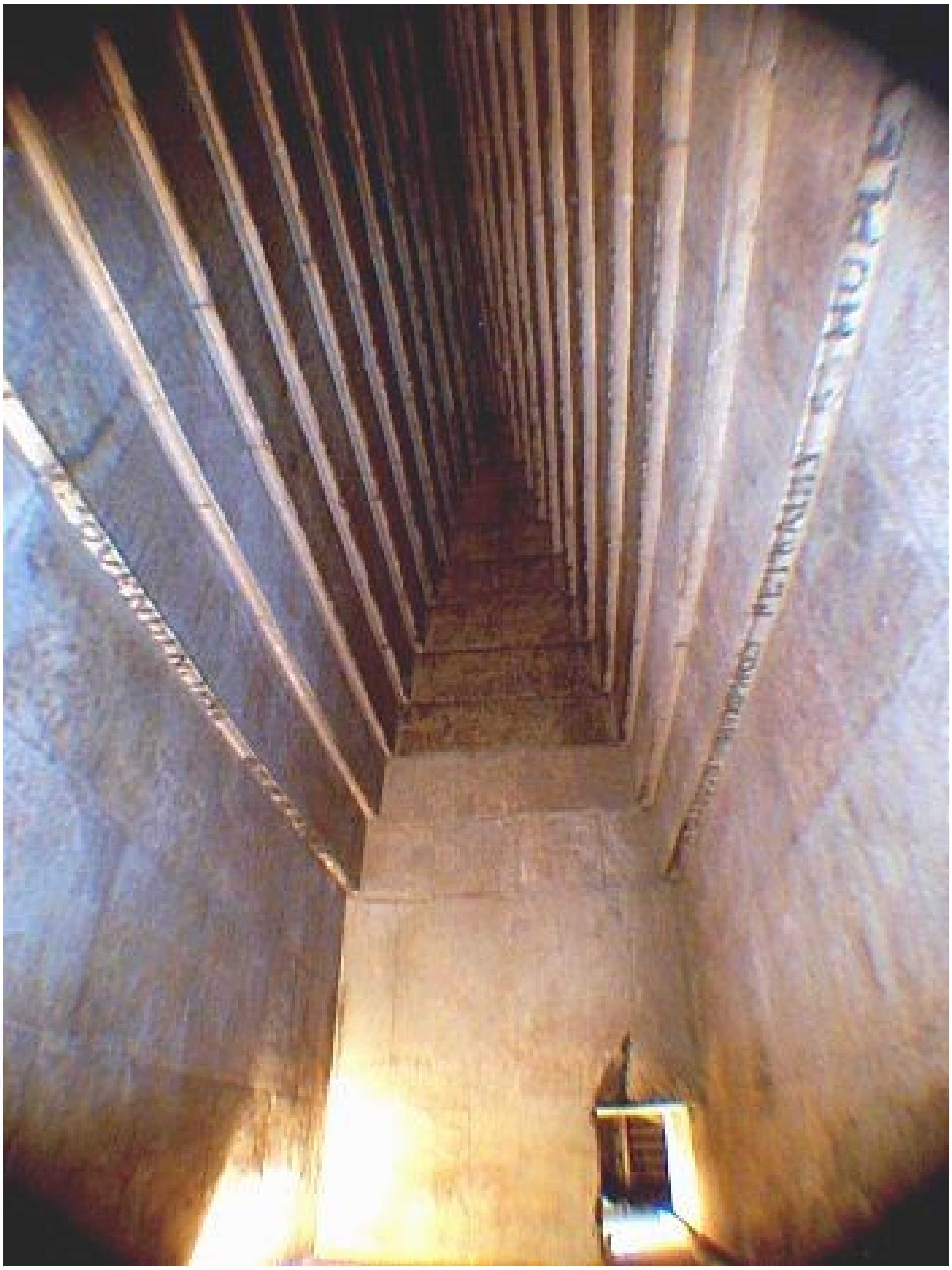
Let's examine the physical aspects.

Pressure

*"The ammonia synthesis loop operates at temperatures of 300–500 °C (572–932 °F) and **pressures ranging from 60 to 180 bar depending upon the method used.**"*

https://en.wikipedia.org/wiki/Haber_process#Pressure/temperature

60 bars = 60 atmospheres, or the pressure of water at the depth of 600 m, or, if you replace water with granite, which is 2.7 times denser, then the height required to produce/retain such pressure would be 200+ m. But the Red Pyramid is about 100 m high. And in tunnels, through which gas, water and other materials were supplied, pressure should be maintained with something mobile or liquid like water, rather than a permanent block like granite. Even if we assume that ancient engineers/chemists could have used another catalyst, or they used a less productive smaller pressure (still the output would be huge because of the huge chamber volume), the problem of retention an extraordinary pressure should be solved one way or another. A sophisticated configuration of stones that expands toward the top, like we see in the Red Pyramid chamber walls, can retain extra pressure:

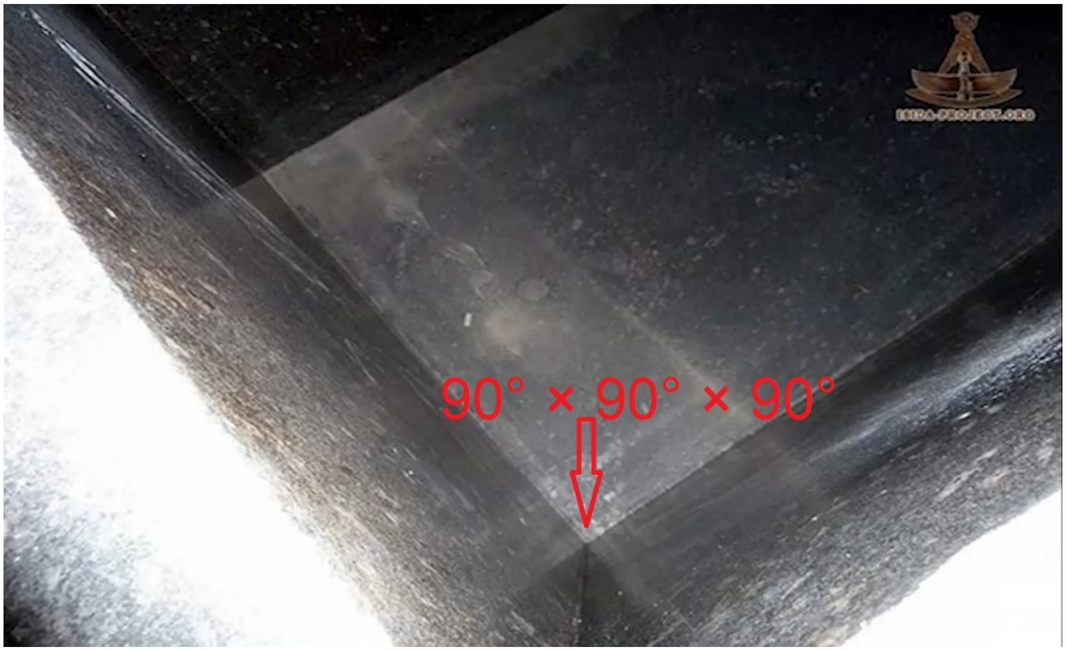


http://guardians.net/egypt/red/images/red1-98b.jpg

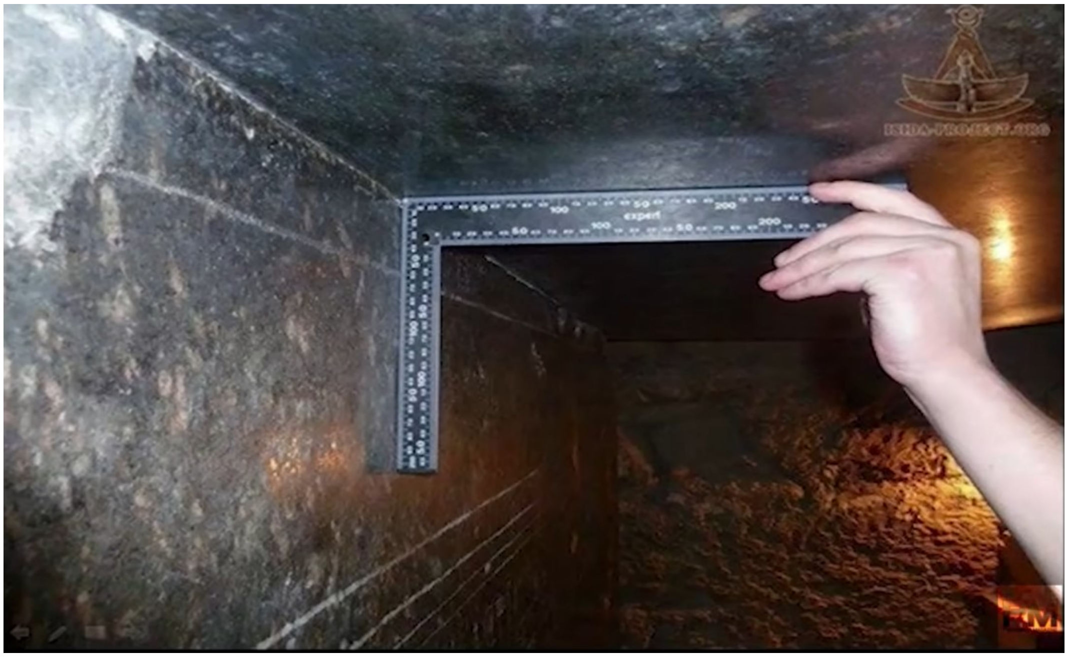
In addition to such configuration, a technology that manages gravity can multiply retention power of the chamber. We explored the physics of such technology in the book, and this technology can solve two other problems:

Stone Cutting

No saw blade can cut perfect 90°×90°×90° **inner corner** in a granite box:



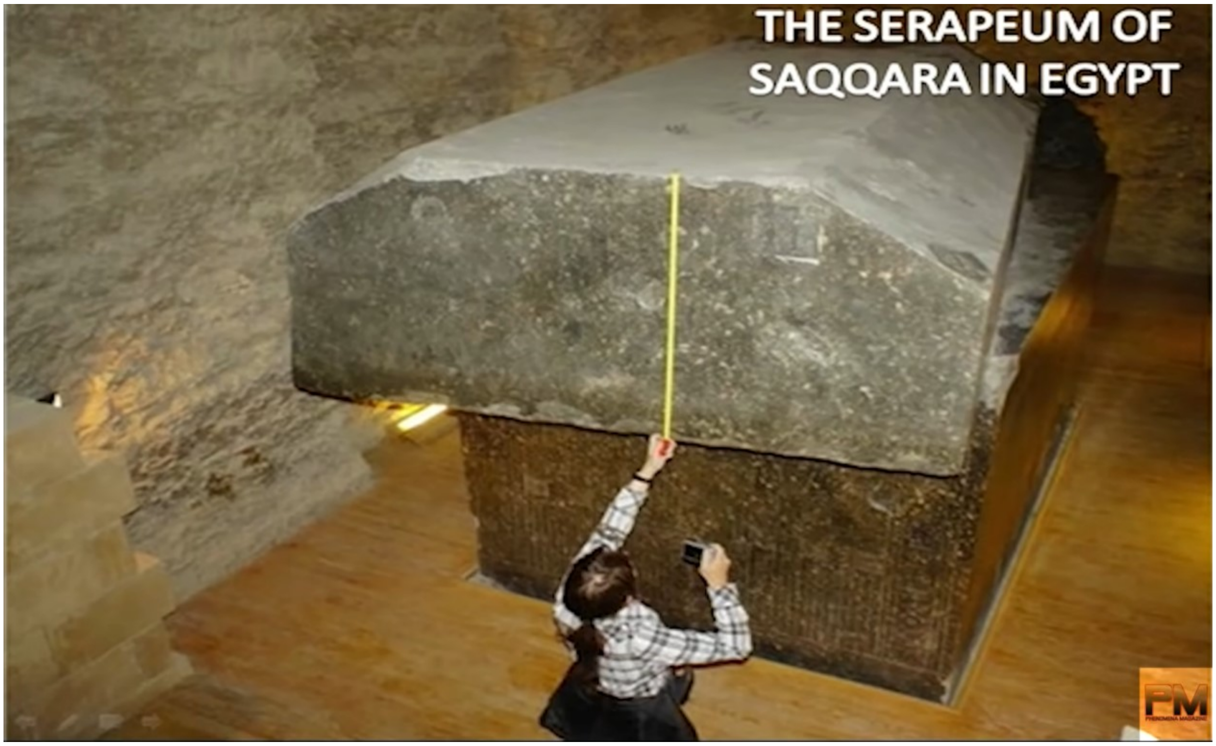
https://youtu.be/0CeKA8_X0DA?t=6406



But that can be done with the technology based on time dilation. This technology can evaporate any material, better than lasers can (we discussed on page 93).

Moving 10-1000 ton Stones

The same technology can counter gravity to transport huge stones like this one (and whatever found in megalithic architecture):



https://www.youtube.com/watch?v=0CeKA8_X0DA&t=6357s

35. PLANCK's CONSTANT WAS SMALLER IN THE EARLY UNIVERSE

dreamstime
Download from
Dreamstime.com
This watermarked comp image is for previewing purposes only.

https://thumbs.dreamstime.com/z/passage-time-clock-falling-apart-burning-concept-72445393.jpg

Einstein introduced energy-mass equivalence, rejected Newtonian absolute time and introduced time dilation, got the Nobel prize for the photoelectric effect (light or photon energy), and he was looking for something more universal than his two relativistic theories. If denote by **D** time dilation factor (how much time is slower in one area compared to another; with **D** = 1 when no difference in passage/speed of time), then his findings can be summarized in 3 formulas:

- $E = mc^2\times\mathbf{D}^2$ — static matter energy (elaborated in chapter 20);
- $E = mc^2\times(\mathbf{D}+1/\mathbf{D})/2$ — relativistic energy (elaborated on page 73);
- $\mathbf{E = \hbar\,\nu}$ — light wave energy ($\hbar$ – Planck’s constant, ν – light frequency).

The last formula does not conserve energy when ν drops because of Hubble Redshift. The reason for Hubble Redshift is in time speeding up ($\mathbf{D} < 1$ for our time compared to the past time). Energy is still conserved if count ν number of harmonics over **D**-prorated time period, like this:

- **$E = \hbar\,\nu/\mathbf{D}$.**

Einstein bound time and energy!

Where does $\mathbf{D}^2$ in $E = mc^2 \times \mathbf{D}^2$ come from? It comes from Joules' change over time (Joules is a unit of energy). For example, time in our Universe sped up twice during the last 14 billion years, that gives our time dilation value as 0.5 if compared to the time flow 14 billion years ago, thus, Joules now is 4 times smaller than it was 14 billion years ago. Thus, the energy conserving formula should compensate for Joules unit change, like it does in the formula above for the energy conserved in matter. Because of Joules' change, formula $E = \hbar\,\nu$, or even formula $E = \hbar\,\nu/\mathbf{D}$ does not conserve energy of the light due to time speeding up (observed as redshift) in our Universe. To counter Joules unit degradation by $\mathbf{D}^2$ (remember, $\mathbf{D} < 1$ because time speeds up), $E = \hbar\,\nu/\mathbf{D}$ formula should be adjusted to $E = \hbar\,\nu/\mathbf{D}^3$. Let's rewrite it as

- $E = \hbar(\mathbf{D}) \times \nu$, where $\hbar(\mathbf{D}) = \hbar/\mathbf{D}^3$.

This means that 14 billion years ago $\hbar$ was 8 times smaller than now, and it continues to grow as $\hbar/\mathbf{D}^3$ (with $\mathbf{D} < 1$ and **D** decreasing), where $\hbar$ its current value. Planck's "constant" dependency on time speed/dilation can provide a new perspective on processes possible at lower rungs of the time-to-matter evolutionary ladder.

James Webb telescope observes the Universe at redshift values 16-20, and such redshift translates into time dilation **D** at 17-21 range compared to our time, which translates into Plank's "constant" being 5,000-10,000 times smaller than its current value. What implications should be for the physics of galaxies then? At the beginning of time, when it was thousand (or million) times slower, therefore Planck's "constant" was a billion (or a million of trillions) times smaller, what processes were going on then? Lower values of Planck's "constant" in the early Universe mean lower energy barriers, which make some currently impossible/improbable processes very much probable when time was very slow. And with time burning/speeding up in the

Universe and with Planck’s “constant” growing, the set of probable processes changes.

Another area of slow time is inside particles/nucleus/atoms. Check strong force explanation by large **D**-values and large **D^5**-factor in chapter 27. Time inside particles is slower than time inside nucleus, time inside nucleus is slower than time in atoms, and time in atoms is slower than our time. Thus, Planck’s “constant” and the set of possible/probable processes change from layer to layer.

Image at the top of the chapter illustrates matter from time burning explained in chapter 11.

36. TIME SPEEDS UP IN THE UNIVERSE, BY WHAT FORMULA?

How come that time was twice slower 14 billion years ago, 12 times slower 32 billion years ago, and so forth, but there is no math formula for time (or time dilation) derived from these measurements?

Let's denote by "**t**" how much of our time passed between some moment in the past and now. And let's try to find formula **D(t)** for time dilation at some point in the past: **D(t)** stands for how many seconds of our time passes for 1 sec of the time that was t-time ago, for example:

- D(14 billion years) = 2, meaning 2 our seconds pass for 1 sec of the 14-billion-year-old time;
- D(32 billion years) = 12, meaning 12 our seconds pass for 1 sec of the 32-billion-year-old time;
- ...

Let's denote by "$\boldsymbol{\tau}$" time local to the past (local to 32 billion years ago, local to 12 billion years ago, ...), and by **Δ** we denote small interval in time. For 1 second of the past time $\boldsymbol{\tau}$, D(t) seconds of our time pass:

$\Delta\tau = D(t)\Delta t$ — just comparing number of past and current seconds.

$\Delta t = 1/D(t)\ \Delta\tau$.

Let's run total over the last formula: $\sum \Delta t = \sum 1/D(t)\ \Delta\tau$.

Left side total is our time actually: $\sum \Delta t = t$.

On the right side we have two variables t and τ, we can get rid of τ by replacing $\Delta\tau$ term with $D(t)\Delta t$:

$\sum 1/D(t)\ \Delta\tau = \sum 1/D(t)\ D(t)\Delta t = \sum 1\ \Delta t$.

All the above in a single line:

$t = \sum \Delta t = \sum 1/D(t)\ \Delta\tau = \sum 1/D(t)\ D(t)\Delta t = \sum 1\ \Delta t$

And $\sum 1\ \Delta t$ is just an integral of 1 from 0 to t:

$$\int_0^t 1dt$$

Thus, the equation comes to:

$$t = \int_0^t 1dt$$

which is always true.

That explains why practically any function D(t) can describe time dilation, and why no math formula for time is derived from Hubble measurements. **Time dilation D(t) value only depends on how much time was burnt into matter between t-time ago and now, check details in chapter 11.** And there is neither reason nor data for that burning going at a “constant”, “exponential” or “logarithmic” pace.

P.S. Hubble's law **$D(t) = 1 + H_0 \times t$** is just a linear (first order) approximation, and not a real formula.

37. REAL ASYMMETRY OF TIME IN OUR WORLD

Does time have a direction, and if it has, what would happen if it goes the other way? I'll be talking neither about time as some speculation / perception nor about math / abstract time, only about real / physical time.

- **By time I do not mean time as an abstract 4th dimension in Einsteinian 4-dimensional spacetime surrogate**. Einstein rejected absolute time and explained gravity by time dilation, the term he coined for variability of time. Though his gravity explanation was still mathematical: time dilation curves geodesic lines in his 4-dimensional spacetime, and those curvatures give gravity.
- **Neither I talk about quantum math abstraction of time, where it is just an “absolute” variable “t”.** “Absolute” time is an intuitive concept, meaning it does not slow down or speed up. Newton, for example, insisted on time going at an absolute pace, that is why he could not explain what causes gravity.

Let’s talk about real time passage. In this book we have learned that time speeds up in the Universe, and the current rate is H_0, which is inverse to 14 billion years, H_0=1/(14 billion years). Time sped up twice in the last 14 billion years. Reason for time speeding up is in time burning into matter. And our galaxies feed off this burning and its ashes. That alone already indicates that the direction in which our time goes is the direction where it speeds up.

Remember, time in the past was slower. Now, what would happen if time goes in the opposite direction, and time starts slowing down? Interestingly, that would destroy our world literally / physically, and here is how and why.

Time dilation (or time speed difference) is not only a source or reason for gravity, it is the strongest barrier / force ever known: the bigger the difference in time speed, the harder such a time speed barrier to cross. All atoms and particles exist because they have a shell, which is a border between slower time inside and faster time outside. Check chapter 27 for a quick recap on Time Dilation as Strong Force.

And if time in the Universe goes the opposite direction into the past, where the time slows down, then time outside of atoms and particles slows down. And the difference between time speed inside particles and atoms (which is slow time) and the time speed outside (which, as we intentionally hypothesized in this chapter, slows down) would vanish / weaken eventually, so the barrier, which is the shell of atoms and particles, would vanish / weaken. The microworld would disintegrate / decay and matter would disappear eventually.

38. UNREALISTIC EINSTEIN AND DOGMATIC MODERN PHYSICS

This chapter is for the readers who skipped all hardcore physics in this book but still do not mind a digest of it. And it exposes the difference between reality and math models of reality.

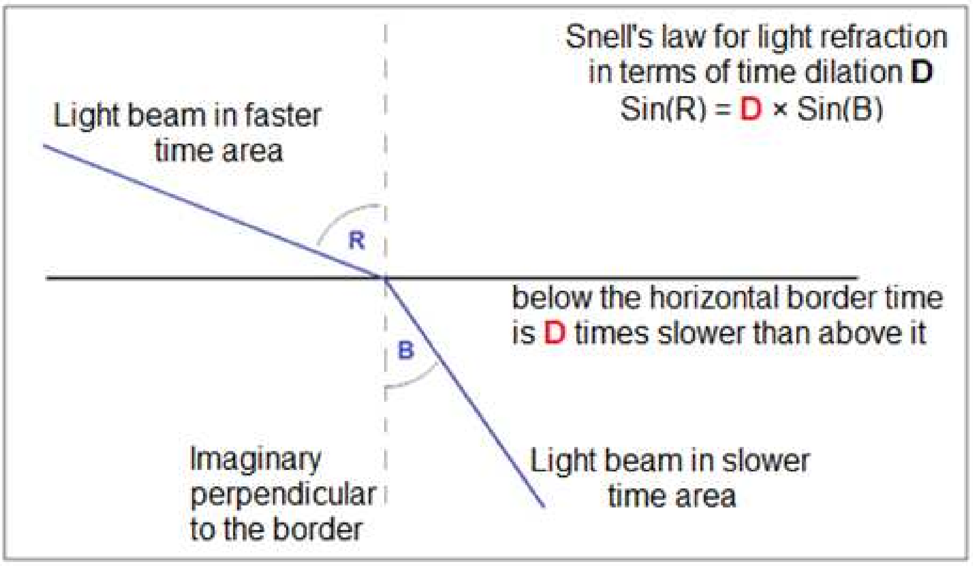
> *Everybody knows that Einstein figured out that space curves around mass,* ***or did he?*** *First experiment that proved space curvature around the Sun was when astronomers observed some stars during eclipse that were hidden behind the Sun,* ***right?*** *And some stars are so massive/dense that curvature of space around them breaks Black Holes in space****, right?***

ACTUALLY, ALL WRONG! — Space does not curve and Black Holes do not exist. Although Einstein was right in his math model. But modern scientists say that this is the reality, when it is not!

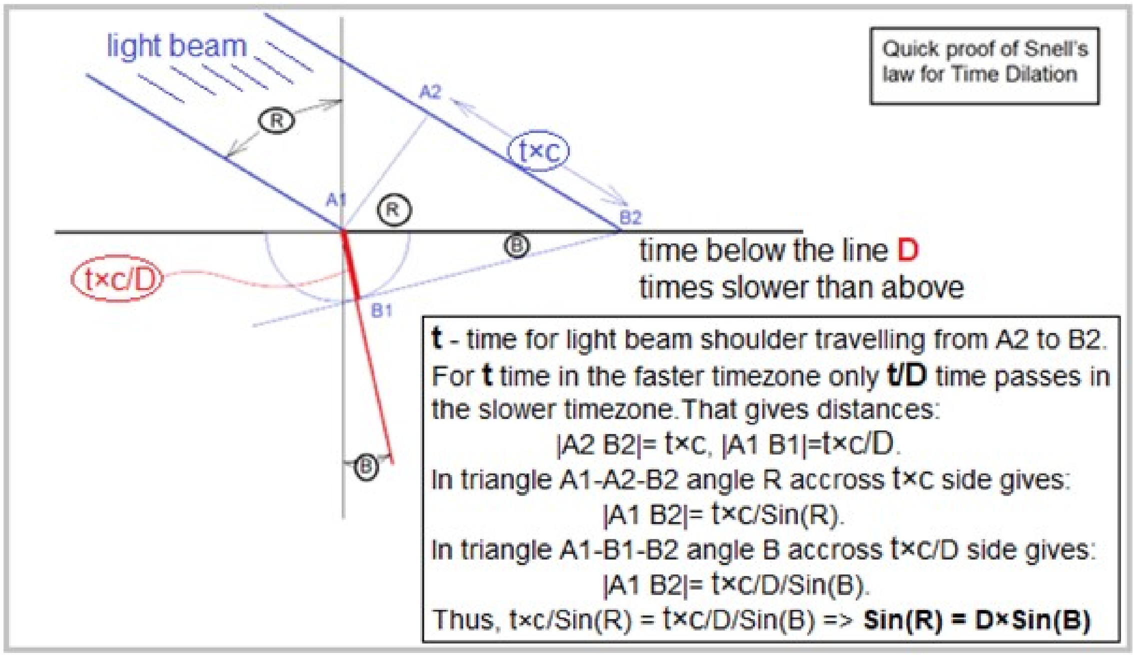
Let's start with the moment when Einstein rejected "absolute time" ("absolute time" means time flows at the same pace everywhere and always). Einstein coined "time dilation" term for variability of time flow. And Einstein suggested that around massive objects time slows down. For example, and it is confirmed by measurements, the difference between a second on the surface of the Earth and a second far away from the Earth is approximately one billionth of a second.

Another Einstein's (and his predecessor Maxwell's) insight was that speed of light is constant (c=299,792,458 m/sec). We will see later that it is intrinsically synonymous to "time dilation".

Let's discuss what happens to a light beam when it goes through the areas where time speed varies. Actually, you have similar experience when observing light refraction when it goes from air into water and from water into air. In the air/water case refraction happens because speed of light changes from about 300,000 km/sec in air to about 225,000 km/sec in water. There is Snell's law describing such refraction. Similar refraction happens when **speed of time changes**, but speed of light does not change:


Snell's law for light refraction
in terms of time dilation D
Sin(R) = D × Sin(B)
Light beam in faster
time area
R
below the horizontal border time
is D times slower than above it
B
Imaginary
perpendicular
to the border
Light beam in slower
time area

Snell's Law for Time Dilation



t - time for light beam shoulder travelling from A2 to B2. For **t** time in the faster timezone only **t/D** time passes in the slower timezone. That gives distances:

|A2 B2|= t×c, |A1 B1|=t×c/D.

In triangle A1-A2-B2 angle R accross t×c side gives:

|A1 B2|= t×c/Sin(R).

In triangle A1-B1-B2 angle B accross t×c/D side gives:

|A1 B2|= t×c/D/Sin(B).

Thus, t×c/Sin(R) = t×c/D/Sin(B) => **Sin(R) = D×Sin(B)**

Simple Proof

Such refraction of light happens when a beam passes near the Sun. That is why astronomers can observe some stars that are behind the Sun. There is no actual/real bending of space around the Sun. It is just an optical effect.

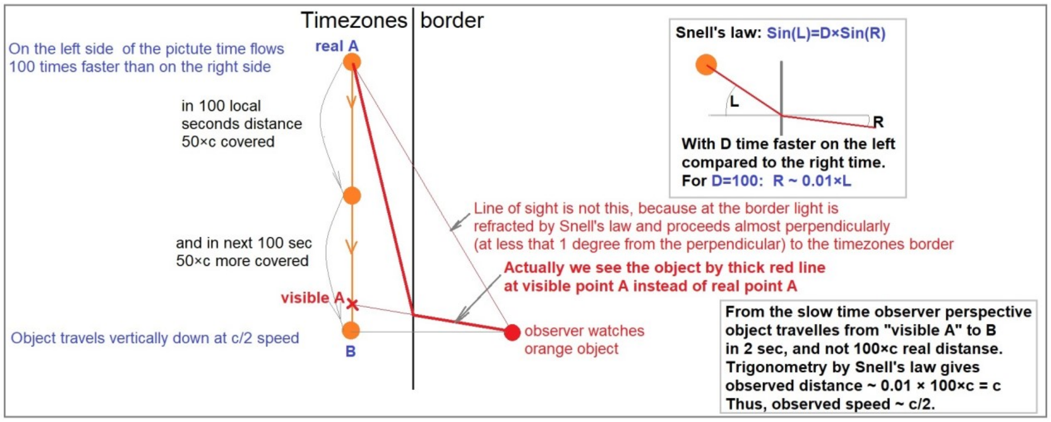
In Einsteinian 4-dimensional surrogate model of 3-dimensional space and 1-dimensional time there is bending of geodesic lines. That is how he explained gravity mathematically. Now, back to the real world — why not only light beams bend, but there is a gravitational force? Short explanation:

> *In slower time quantum fluctuations are slower. And quantum fluctuations go on everywhere inside atoms and particles and outside in space. In a nutshell, Quantum Fluctuations are Time or Universal Clock, like heartbeat of a processor is the time/clock for a computer, or like our pulse is our time/clock. And any atom in an area of uneven time experiences a difference in pushes from quantum fluctuations (there are more pushes from one side than from another). That is how time dilation causes gravitational force, and it is not a pull, but a push force towards areas of slower time. More details in chapter 18.*

So, there is no actual bending of space, thus, there is neither broken space nor Black Holes in space. More details in chapter 24. By the way, Einstein was the first who said that Black Holes do not exist - it is just a mathematical conundrum/blunder.

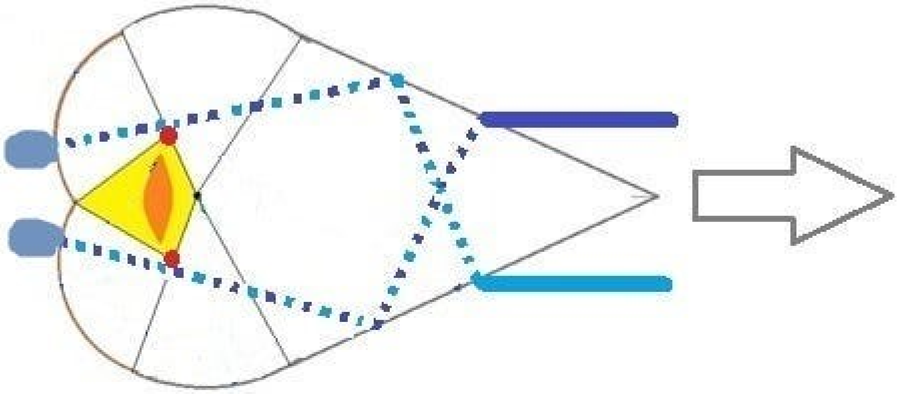
> Now, to why time dilation and constant speed of light are synonymous:
>
> *All variability of speed of light, which is stated as 299,792,458 m/**sec**, is hidden inside variability of **sec**. Actually, 299,792,458 m/**sec** is the definition of a local **second**: how long it takes for the light to cover the distance of 299,792,458 m in this area. Hypothetical “viscosity” or “density” of space, from which Maxwell derived speed of light, was introduced in his formulas. That brings us back to chapter 29 explaining time as Aether/Ether of space.*

And check chapter 16 explaining (without space bending, just by Snell's refraction) how travelling 100×c distance in 2 seconds does not violate c-speed-limit:


Timezones
border
On the left side of the pictute time flows
100 times faster than on the right side
real A
in 100 local
seconds distance
50×c covered
and in next 100 sec
50×c more covered
visible A
Object travels vertically down at c/2 speed
B
Snell's law: Sin(L)=D×Sin(R)
L
R
With D time faster on the left
compared to the right time.
For D=100: R ~ 0.01×L
Line of sight is not this, because at the border light is
refracted by Snell's law and proceeds almost perpendicularly
(at less that 1 degree from the perpendicular) to the timezones border
Actually we see the object by thick red line
at visible point A instead of real point A
observer watches
orange object
From the slow time observer perspective
object travelles from "visible A" to B
in 2 sec, and not 100×c real distanse.
Trigonometry by Snell's law gives
observed distance ~ 0.01 × 100×c = c
Thus, observed speed ~ c/2.

39. SECOND LAYER IN BOB LAZAR's CRAFT SHIELDING!

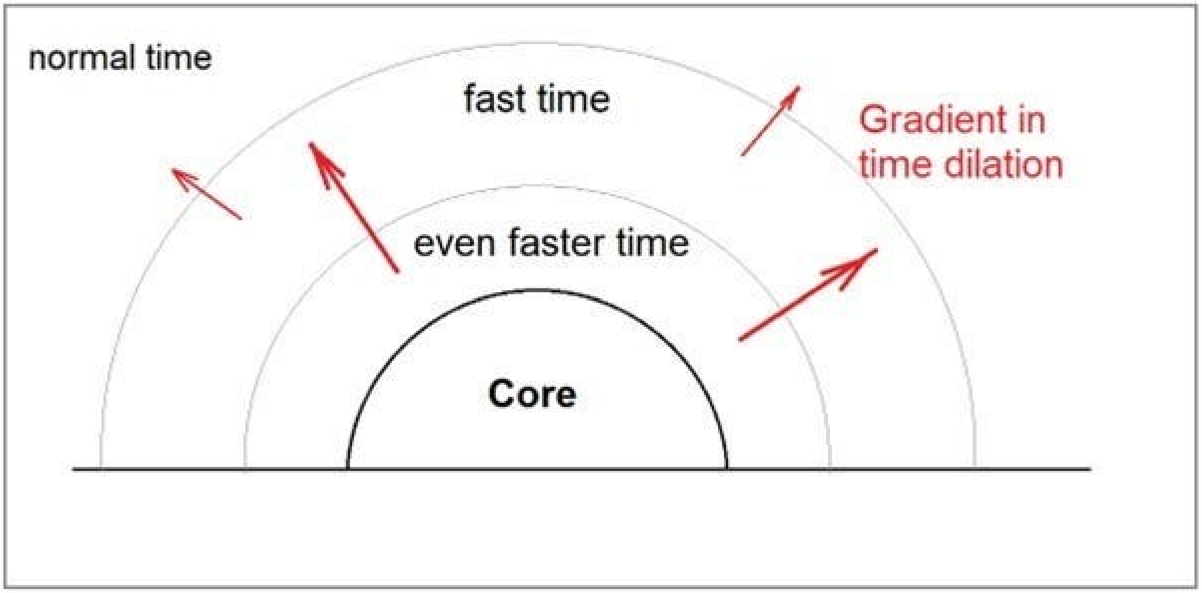
In chapter 22 we discussed how time dilation physics protects the craft from collisions.



Craft in orange, yellow — safety zone, blue — incoming matter

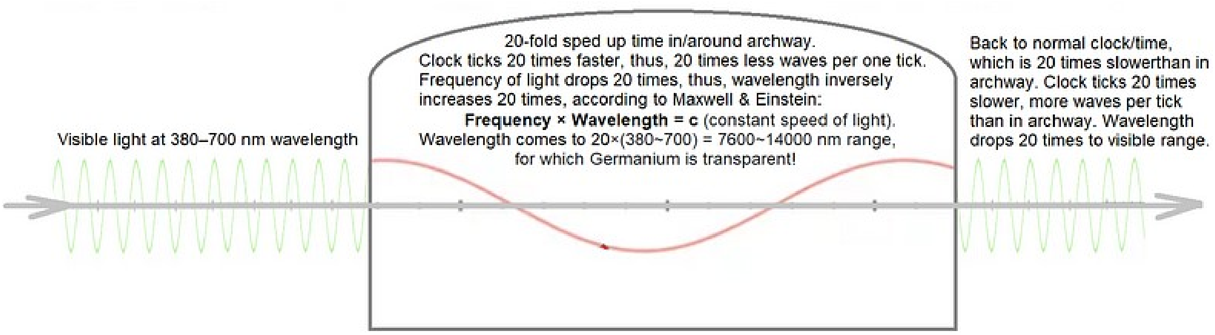
Turns out there is an extra shield, and I missed it despite all physical evidence was presented by Bob Lazar.

In chapter 15 we understood that time around the working core speeds up, that explains the repelling effect around the core, and how crew survives extreme accelerations.



I should have asked then: “Does fast time span the walls?” Let’s answer it now.

In chapter 26 we explained Bob Lazar’s observation of an archway becoming transparent by time speeding up around the wall.


Visible light at 380–700 nm wavelength
20-fold sped up time in/around archway.
Clock ticks 20 times faster, thus, 20 times less waves per one tick.
Frequency of light drops 20 times, thus, wavelength inversely increases 20 times, according to Maxwell & Einstein:
Frequency × Wavelength = c (constant speed of light).
Wavelength comes to 20×(380~700) = 7600~14000 nm range, for which Germanium is transparent!
Back to normal clock/time, which is 20 times slowerthan in archway. Clock ticks 20 times slower, more waves per tick than in archway. Wavelength drops 20 times to visible range.

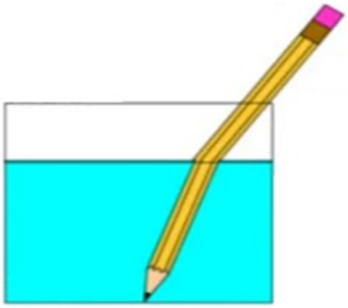
In the archway light is redshifted (wavelength increases to infrared)

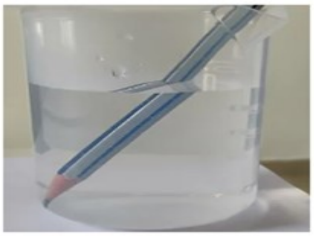
Thus, time is fast inside the operational craft and around its wall, and time outside the craft is slow. In chapter 27 we discussed that the barrier from slow time to fast time is the strongest barrier known. Physicists labeled it as “strong force”, but Bob Lazar calls it “gravity A”. Thus, such design repels everything from touching the operational craft from outside (similar to why Bob could not touch the working core shield, around which time was even faster).

40. OBSERVER IN PHYSICS: REALITY VS. ILLUSION

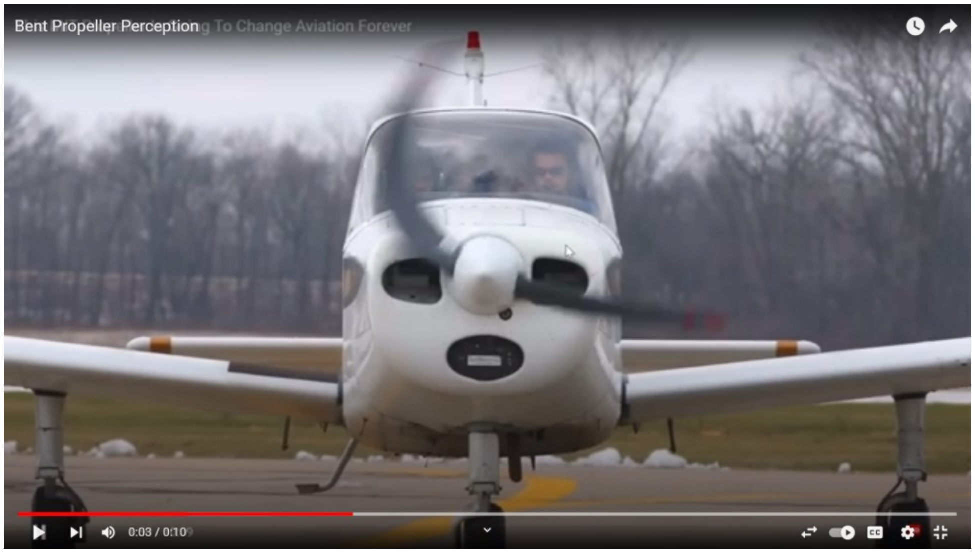
Why theoretical physicists are so persistent in bringing an observer (or a concept of an observer) in their theories, if physics is supposed to be a science about reality, which is objective and not subjective at all? Let's start with what we all understand well, before looking into Einstein's relativism or Quantum Physics illusions.

We all have experienced an illusion of spoon or pencil bending/breaking in water:





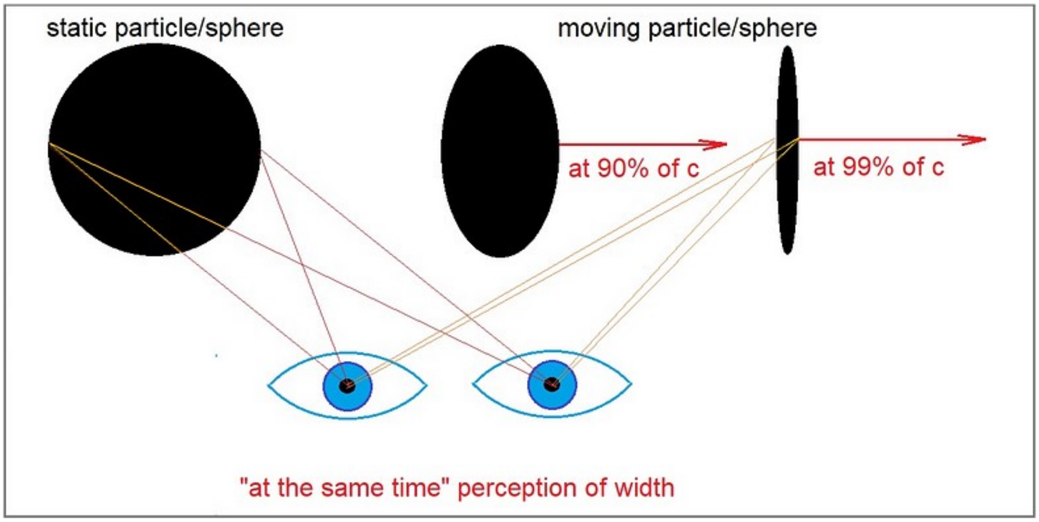
And many of us saw videos with rotary blades on airplanes or helicopters curving / bending:



https://www.youtube.com/watch?v=Ihq6gYGeHhs

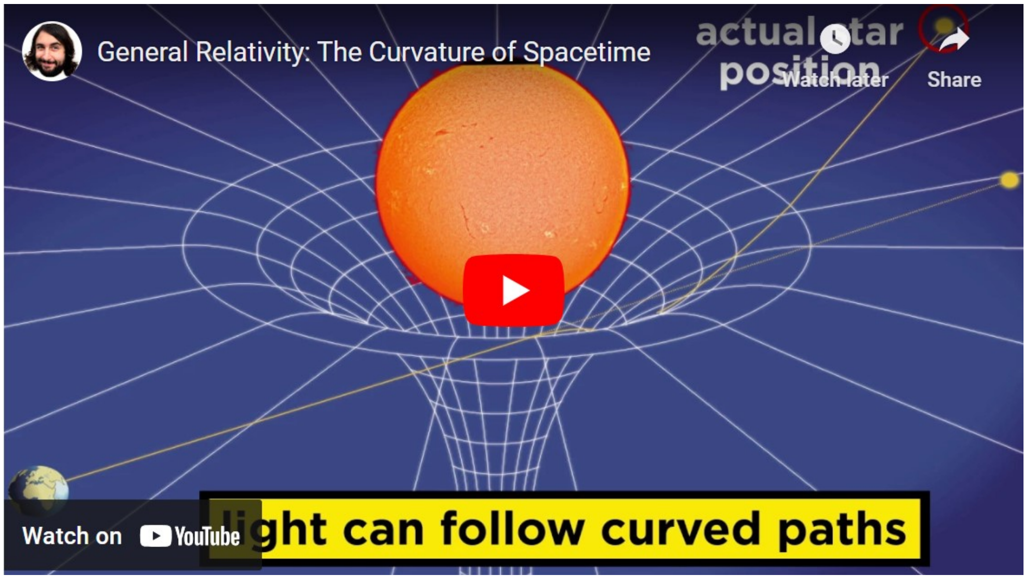
We understand well the difference between perception and reality in both cases.

Some of us have heard about Einstein’s Special Relativity (**SR theory**): time in fast moving objects slows down and such objects shrink or flatten:



c is the speed of light ~300,000 km/sec

And some of us have heard about Einstein’s General Relativity (**GR theory**) about time slowing down around mass and space bending around stars and planets, which causes gravity:


General Relativity: The Curvature of Spacetime
actual star position
Watch later
Share
Watch on YouTube
light can follow curved paths

https://youtu.be/R7V3koyL7Mc

Actually, Einstein was right or real about time slowing down only, but wrong or unreal about objects and space changing sizes or metrics. Spatial effects of **SR and GR** are illusions, like pencil and rotary blades bending are illusions only.

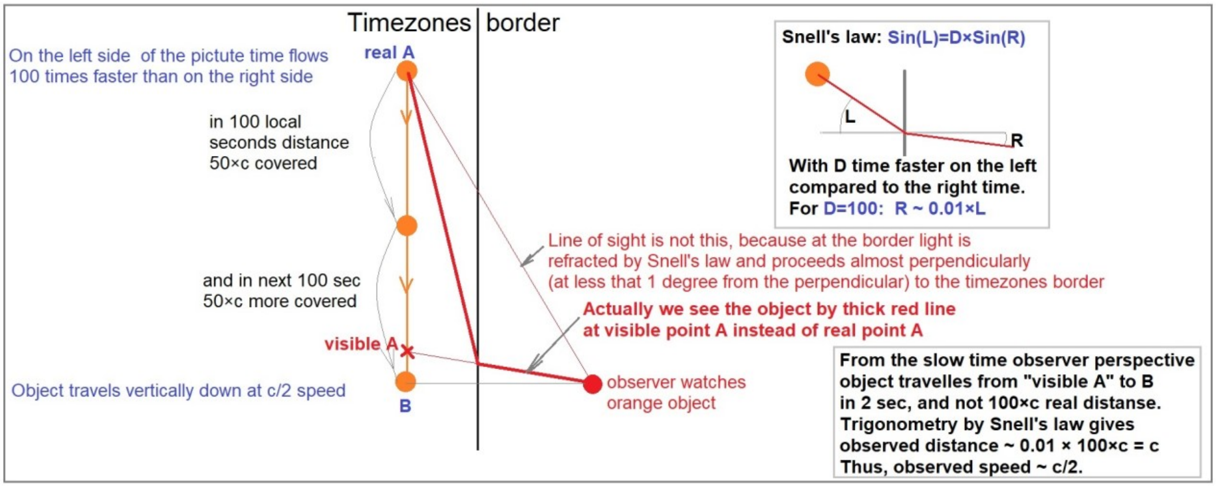
We do not experience time dilation in our life ever, do we?

https://youtu.be/JGcoVTzLUj4

The reason for not having a perception of time speed change/dilation is evolutionary:

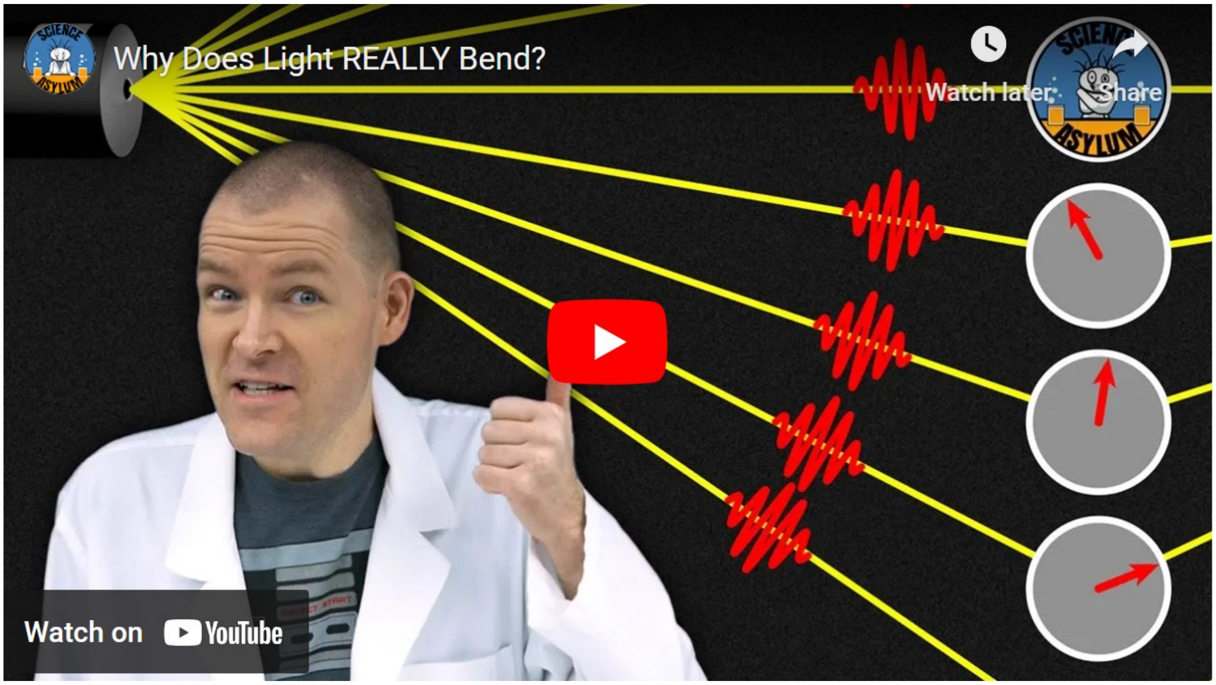
1) time speed on the Earth and away from the Earth differ by one billionth only (for a second on the Earth, 1.000000001 of a second passes far away from the Earth);
2) time in the Universe during 70 years of our life speeds up by 0.00000001 only (a second 70 years ago equals 1.00000001 of a second now).

Of course, we don't notice such changes. In chapter 38, Snell's law refraction explains why time dilation causes a curving illusion. Remember this image on how travelling the distance of 100×**c** in 2 seconds is possible without breaking **c**-speed-limit?


Timezones
border
On the left side of the pictute time flows
100 times faster than on the right side
real A
in 100 local
seconds distance
50×c covered
and in next 100 sec
50×c more covered
visible A
Object travels vertically down at c/2 speed
B
observer watches
orange object
Snell's law: Sin(L)=D×Sin(R)
L
R
With D time faster on the left
compared to the right time.
For D=100: R ~ 0.01×L
Line of sight is not this, because at the border light is
refracted by Snell's law and proceeds almost perpendicularly
(at less that 1 degree from the perpendicular) to the timezones border
Actually we see the object by thick red line
at visible point A instead of real point A
From the slow time observer perspective
object travelles from "visible A" to B
in 2 sec, and not 100×c real distanse.
Trigonometry by Snell's law gives
observed distance ~ 0.01 × 100×c = c
Thus, observed speed ~ c/2.

For Bob Lazar's craft, speeding time around its walls is the method for travelling fast. The observer in the picture above observes an illusion of A travelling the distance **c** vs. real A travelling the distance of 100×**c.**

Besides relativistic cases (when "at the same time/moment" perception gives mathematical illusion of shrunk width), in chapters 28 and 33 we discussed quantum physics confusions (illusions, delusions) based on observer/observations. Interestingly, refraction by Snell's law is intrinsically a **quantum** effect:



https://youtu.be/cep6eECGtw4

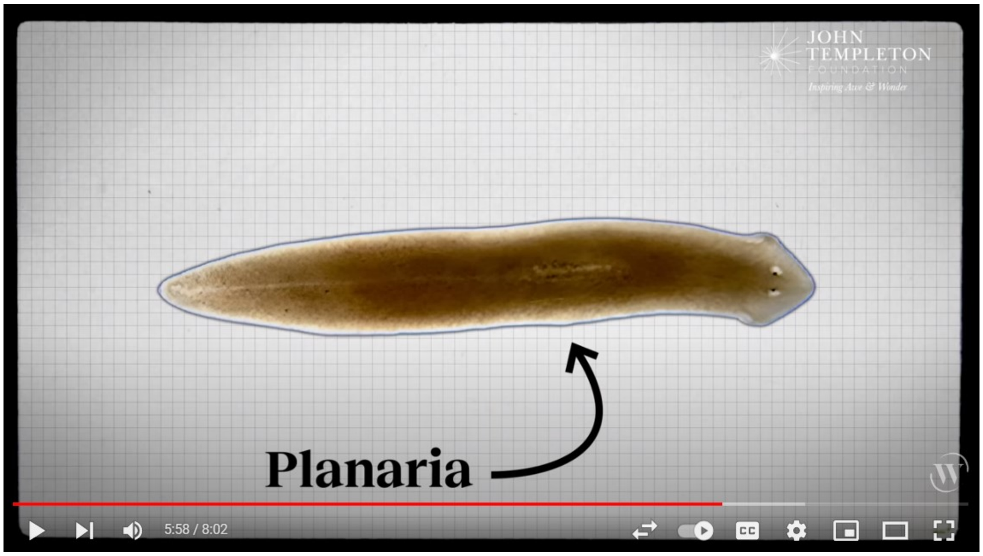
And so is time (which is **quantum** fluctuations), and so is gravity (which is the difference in pushes from **quantum** fluctuations attributed to time dilation) – we have covered that in chapter 18.

Now, the blunt answer to the question at the beginning of the chapter is:

By bringing an observer in their theories physicists tend to bring illusions into the science. Wrapping such illusions in math does not make them real. And predictability of an illusion (even with math) does not mean it is real.

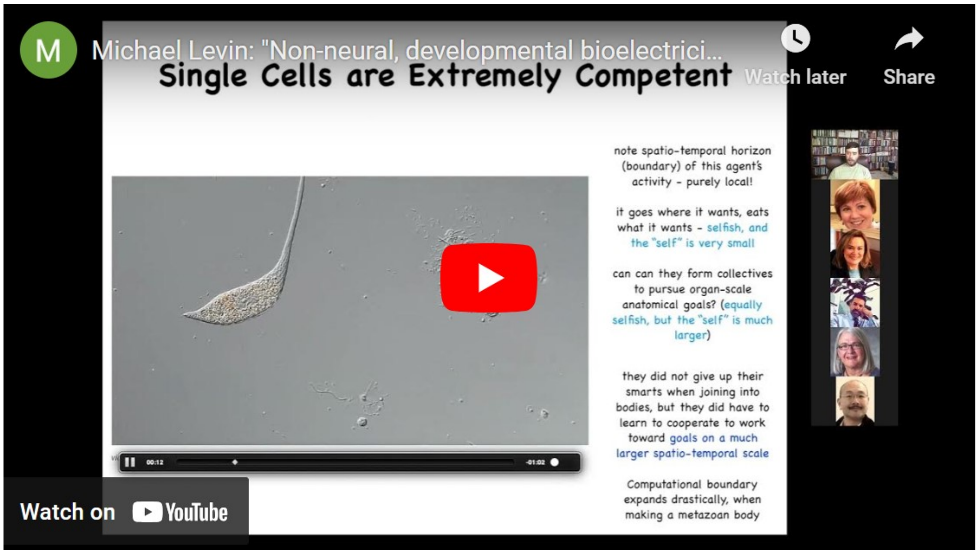
41. MIND BLOWING EVOLUTIONARY EXPERIMENT

In chapter 21 I referenced amazing work of Dr. Michael Levin in context of time and evolution. We see that reality, perception, consciousness, evolution, and time are intertwined. Recent experiment by Dr. Levin blows my mind (besides blowing the head off the subject of the experiment):



https://www.youtube.com/watch?v=0a3xg4M9Oa8&t=357s

If you are not familiar with the work of Michael Levin, the brainless case could be a better starting point:



Michael Levin: "Non-neural, developmental bioelectrici...

Single Cells are Extremely Competent

note spatio-temporal horizon (boundary) of this agent's activity - purely local!

it goes where it wants, eats what it wants - selfish, and the "self" is very small

can can they form collectives to pursue organ-scale anatomical goals? (equally selfish, but the "self" is much larger)

they did not give up their smarts when joining into bodies, but they did have to learn to cooperate to work toward goals on a much larger spatio-temporal scale

Computational boundary expands drastically, when making a metazoan body

https://www.youtube.com/watch?v=3Cu-g4LgnWs&t=781s

42. TIME DILATION AND CLIMATE CHANGE

Or why it was not a meteorite that killed dinosaurs, again.

- By now, we are all aware about heat retention in an atmosphere caused by carbon dioxide, methane, and even by water vapor.
- Excess of oxygen in an atmosphere causes the opposite cooling effect, even dire sometimes: there were several periods of oxygenation (when high levels of oxygen in the atmosphere triggered ice ages) in the history of our planet, with mass extinction caused by the Earth's surface freezing out.

But not many know the most common physical reason for the recurrent mass extinctions (including dinosaurs dying out), which is neither meteorites hitting the Earth nor volcano's eruption. The same extinction would have happened 65–66 million years ago on Venus, if life was there. I covered that in detail in chapter 9. Let me bring the bullet points, and no need to be a physicist, enough to believe in astronomy to understand the topic.

There are three sources for heating the Earth's surface:

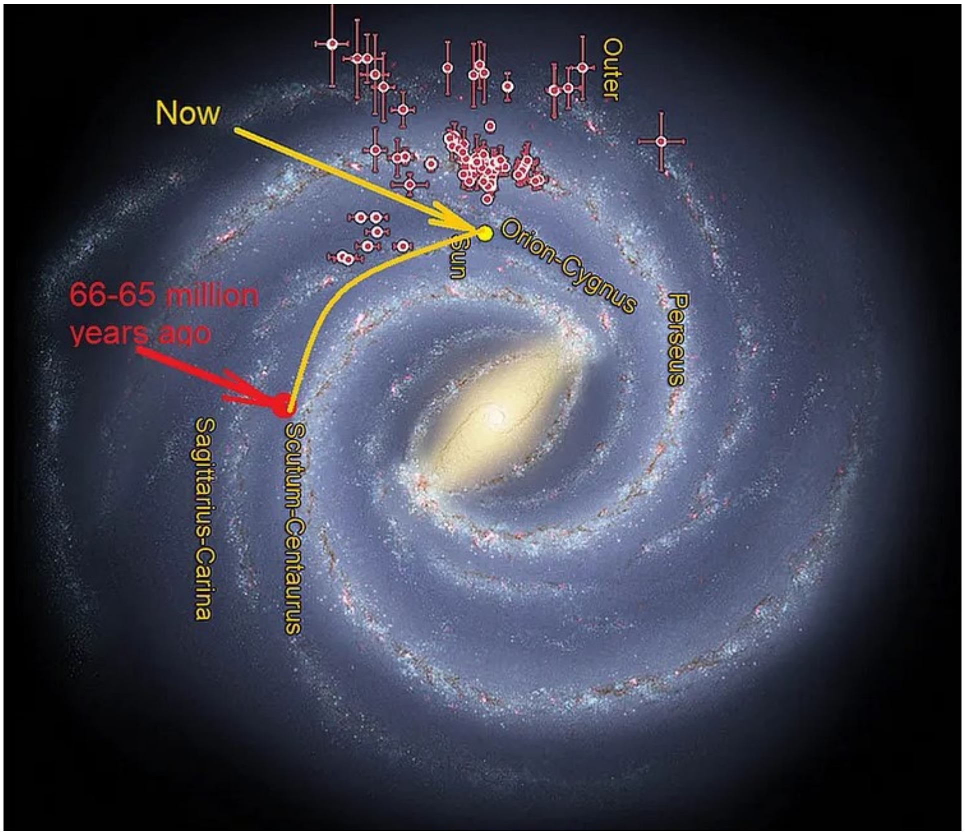
- **The Earth's primordial heat supply from hot magma and processes inside the Earth's core**
- **The radioactive decay of radiogenic isotopes, like Uranium and Thorium, in the Earth's crust**
- **The Sun radiation from above the Earth**

And there is only one way to dissipate this energy out of the Earth by radiating this heat into space vacuum (mostly as infrared, besides sunlight reflection).

- And there are biological ways for consuming and storing such energy, like plants producing carbohydrates using photosynthesis with sunlight. We find these storages as fossil fuels eventually (coal deposits are 100% organic in origin, when most of oil and natural gas has nonorganic origin).
- Energy from the Sun that is not reflected or radiated back into space is consumed and deposited by/via life.

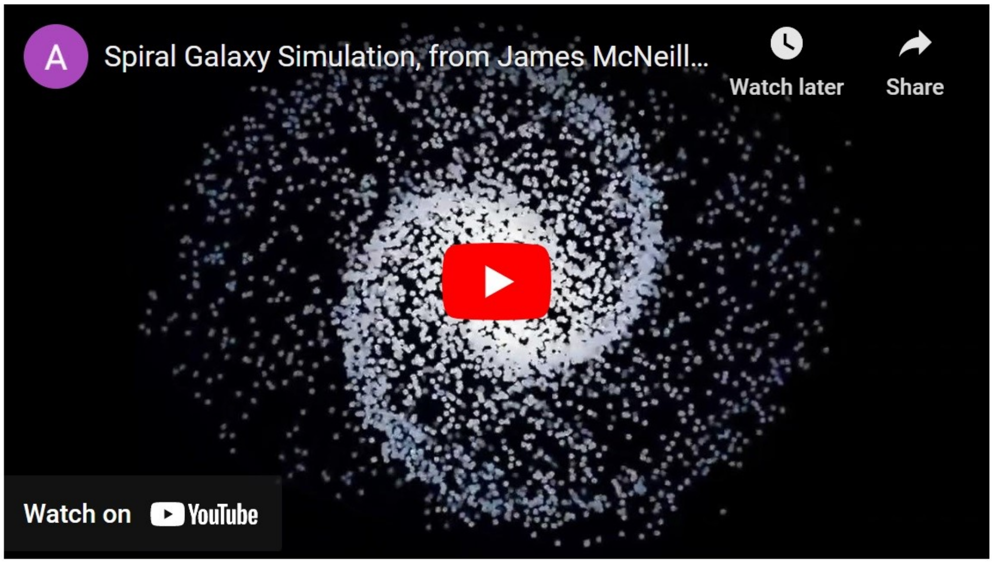
Now, we need to understand a few things **about time flow**:

- Time speed is not absolute everywhere and always (like we think, and like Newton thought). Time flow varies, it can speed up or slow down (Einstein guessed that theoretically, and precise measurements confirmed his “wild guess”).
- There are 3 reasons for us not having perception of time speed:
  1) Time flow/time speed is local, and we cannot think/feel out of the local box.
  2) Time speed differences around us are miniscule: for example, time flow on the Earth differs from time flow away from the Earth only by one billionth (for a second on the Earth, 1.000000001 of a second passes far away from the Earth). It seems miniscule, but all the weight/gravitation we feel comes from that time dilation alone.
  3) Time speeds up in the Universe. For example, its speed increased by factor of 2 in the last 14 billion years. Such a rate, if scaled down from 14 billion years to 70 years of a person’s life, gives a rate of time speed change of 0.00000001 — impossible for us to notice (a second 70 years ago equals 1.00000001 of a second now).
- The most significant change in space time flow is between inside the arms of spiral galaxies and outside of the arms with rate of change of about 0.001 (for a second outside of the arms, 1.001 of a second inside the arms passes). Our Milky Way is a spiral galaxy, and 65–66 million years ago our Solar system exited the Scutum-Centaurus arm of the Milky Way:



Solar system position in Milky Way

When our Solar system was exiting the Scutum-Centaurus arm of the Milky Way, time in our Solar system slowed down. Check a nice computer simulation from James McNeill about stars moving in and out of galactic arms:



https://youtu.be/6Xy1CMrxLkI

- But a much more significant difference is between atomic (and particles) time and space time: time flow inside particles/atoms is many times slower than time flow in space. That is because of time locality, and because atoms (and particles) were created a long time ago, when time in the Universe was very slow. Basically, time in particles/atoms is canned time from that Universe. Read chapter 11 about more cases of canned/slow time.

We have learned all we need to know about time flow. Now, what happens to inflows and outflows of energy on the Earth, when/if time in the Solar system (on the Earth, the Sun, and even Venus) slows down.

- Primordial heat radiation slows down, and so is heat dissipation from the Earth to space — that should not set heat/climate balance off.
- The Sun radiation will slow down a bit, because the fusion reaction between colliding hydrogen atoms slows down. But still, the Sun radiation that stays on the Earth (and not reflects or radiates as infrared from it) is miniscule compared to either primordial heat or radioactive decay: sunlight does not cause tectonic activities like two other sources.
- **Radioactive decay of radiogenic isotopes does not change, because atomic time does not change, only space time changes.** (There is even more to it, check **P.P.S.** at the end.)

Speed/intensity of radioactive decay of radiogenic isotopes does not change, so the heating energy from it does not change. But heat dissipation from the Earth to space decreases— that leads to the Earth crust heating up, resulting in an increase of tectonic and volcanic activities. More carbon is supplied into the atmosphere from volcanic activities. Combined with photosynthesis reduction due to Solar activity decline and volcanic ash in air and on plants screening sunlight, that leads to oxygen reduction in the atmosphere. **Big warm-blooded species, like dinosaurs, got a double hit (increased temperature, even at night time, and lowered oxygen), which resulted in their extinction.**

Meteorites' activity increases when the Solar system crosses Milky Way arms' borders, as it is explained in chapters 2 and 9 by geodesic lines change caused by time dilation. But that is just an additional complication, and not the root cause of the extinction of dinosaurs. **Though it is a common misconception, even among renowned physicists, that a meteorite killed dinosaurs:**

https://www.youtube.com/watch?v=yDkeWxbxw4A

But if look at H-bomb test results carefully, damage on the Earth surface is basically limited to about 10 miles radius:

https://www.youtube.com/watch?v=j-Z8ym9F9d4&t=80s

Dr. Edward Teller explains such limitation by a chunk of the atmosphere at this radius being thrown out into space. And this radius does not increase even with 1,000 times increase of the explosion power. The same limitation applies to a meteorite hit (+10 miles around meteorite).

Not the cause!
Nuclear Tested!!!

Not the cause of dinosaur extinction!

In the next video, Dr. Teller suggests that a meteorite hitting the ocean would be much more destructive by triggering huge tsunami:

https://www.youtube.com/watch?v=j9b2TO5APRs

But such a hit being deadly to dinosaurs, and not to sharks in oceans, and not to alligators or crocodiles on continents, just does not add up. Big cold-blooded and small warm-blooded species survived this extinction 65–66 million years back. It happened when the Solar system was exiting a Milky Way arm and was entering a slower time zone (it took a while).

P.S. And yes, it is the same Dr. Edward Teller who helped Bob Lazar to get into the EG&G Special Project in Area 51. He looks younger in this interview (and so is Bob Lazar):

https://www.youtube.com/watch?v=8PCRxIG9Enk

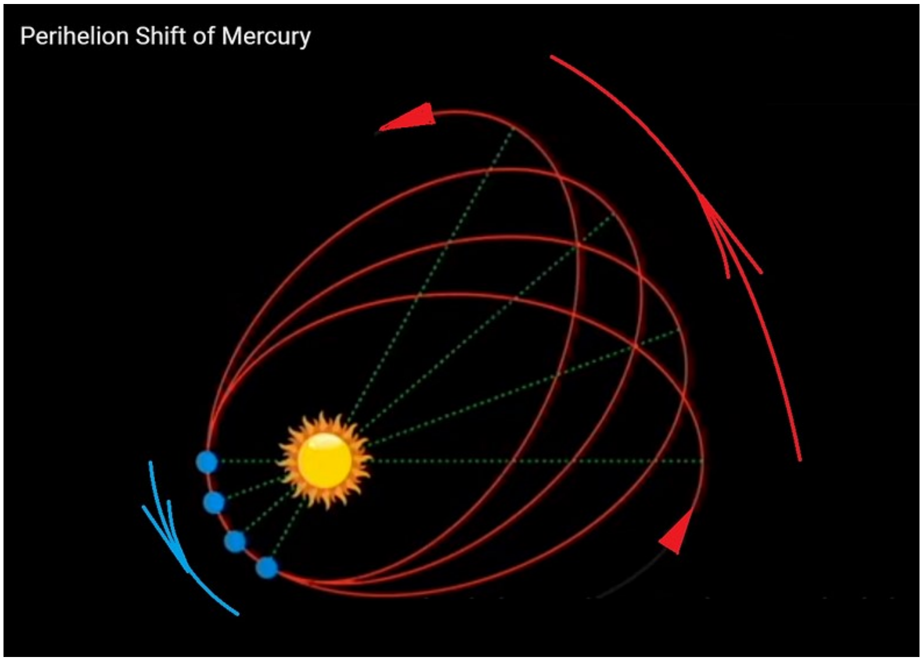
P.P.S. Actually, **radioactive decay surges when space time slows down**, which sounds counterintuitive, unless you read chapter 27: the barrier between slow atomic time and space time lowers down then. Thus, energy flow from radiogenic isotopes increases when the Earth (along with the Solar system) leaves a Milky Way arm, which contributes to the Earth warming even more.

43. MERCURY PRECESSION WITHOUT SPACE BENDING ILLUSION

Since Kepler we know that planetary orbits are elliptical or circular. Newton explained that with his “inverse square law” formula for gravitational force between masses m and M at distance R:

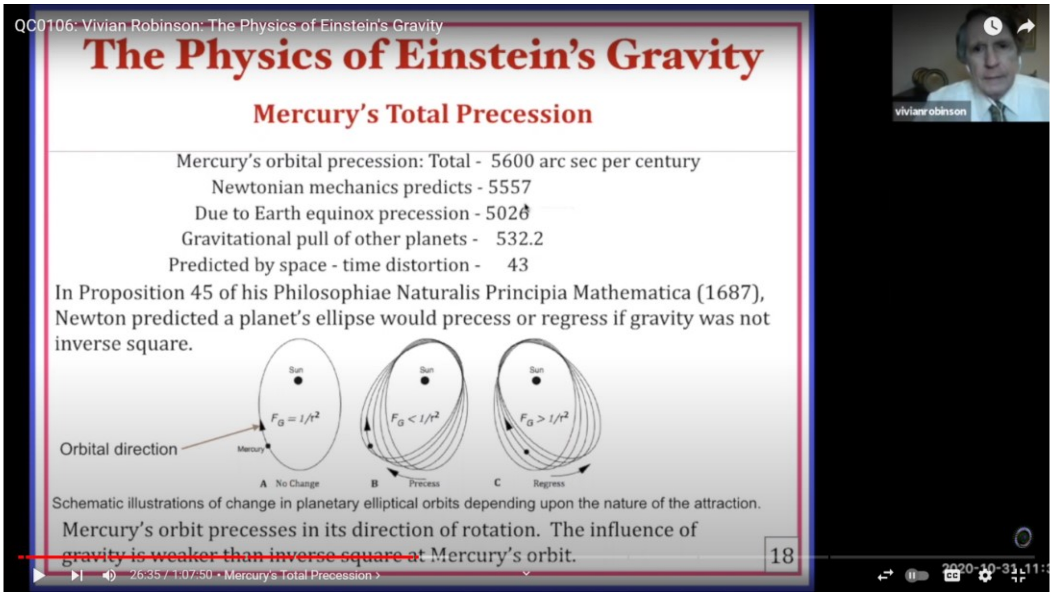
F = G×m×M / R^2, where G is some constant.

If interested, check https://www.youtube.com/watch?v=3oGATSP1KJ0 deduction of Kepler’s laws by Newton’s calculus. For the simplest circular orbit, when distance R does not change, planetary velocity value is constant: V = sqrt(G×M/R). But what puzzled all scientists is the precession of the Mercury orbit (shifting/turning of the elliptical orbit):



Mercury Precession

Einstein solved this long-standing puzzle, and that was a triumph of his General Relativity theory. I like Dr. Vivian Robinson presentation of this solution at https://www.youtube.com/watch?v=86mb-D_Sla4&t=1101s, with Newton’s insight on force weaker than G×m×M/R^2 not retaining a planet on its elliptical orbit (precession happens), and force stronger than G×m×M/R^2 pulling a planet inside its static elliptical orbit, causing orbital regression:



QC0106: Vivian Robinson: The Physics of Einstein's Gravity

The Physics of Einstein's Gravity

Mercury's Total Precession

Mercury's orbital precession: Total - 5600 arc sec per century
Newtonian mechanics predicts - 5557
Due to Earth equinox precession - 5026
Gravitational pull of other planets - 532.2
Predicted by space - time distortion - 43

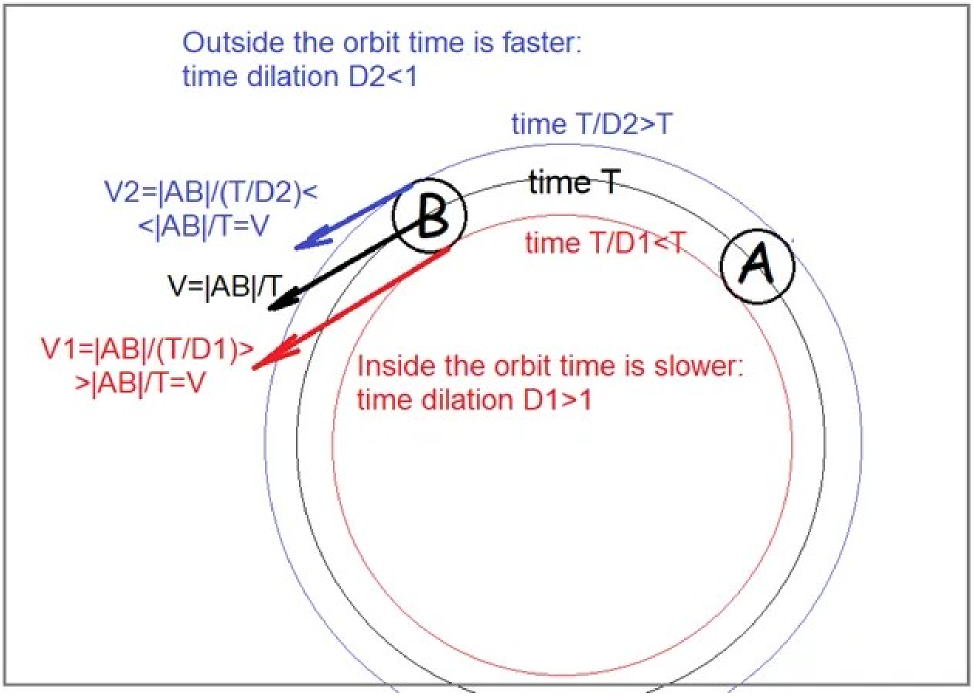
In Proposition 45 of his Philosophiae Naturalis Principia Mathematica (1687), Newton predicted a planet's ellipse would precess or regress if gravity was not inverse square.

Schematic illustrations of change in planetary elliptical orbits depending upon the nature of the attraction.

Mercury's orbit precesses in its direction of rotation. The influence of gravity is weaker than inverse square at Mercury's orbit.

18

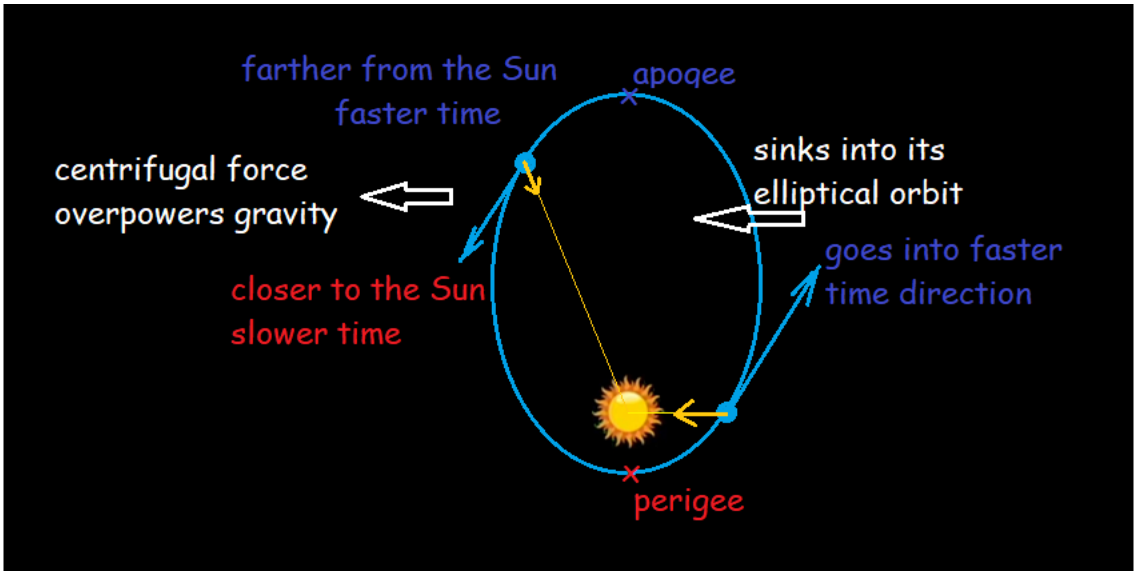
We will return to that insight shortly, from the angle of disbalance between centrifugal and centripetal Newton's gravitational force. As Einstein found, time around mass slows down, so let's explore what happens when a planet enters slower or faster time. Let's start with a circular orbit. Time inside the orbit flows slower, and outside the orbit it flows faster than on the orbit. Velocity of the planet, where it touches faster time, is smaller than the velocity on the orbit, and velocity inside the orbit is greater than the orbital velocity V (see the picture and the explanation below):



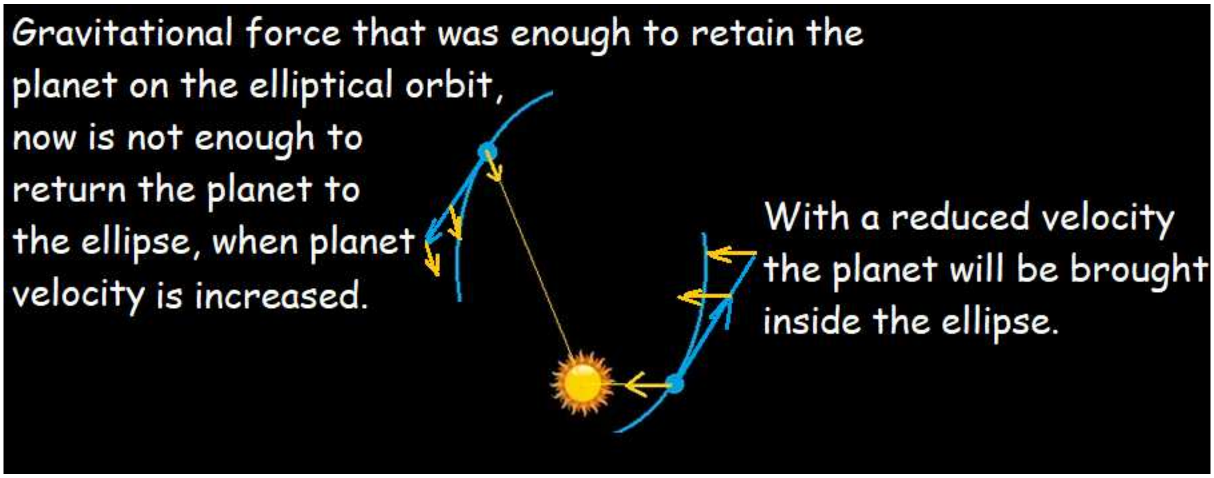
|AB| is the distance travelled between A and B, T – time passed on the orbit, T/D1 – time passed inside the orbit, T/D2 – time passed outside the orbit. Velocity is distance |AB| divided by time passed, thus V1>V (because time dilation D1>1), V2<V (because time dilation D2<1). For V2<V, centrifugal force decreases, thus, planet will sink from the outer blue orbit to the black/current orbit, where centrifugal force is in balance with the Newton's centripetal force. For V1>V, centrifugal force increases, thus, planet will rise from the inner red orbit to the black/current orbit, where centrifugal force is in balance with the Newton's centripetal force. And that line of argument holds true in general:

- When a planet enters slower time, then due to the planet's velocity increase caused by time dilation alone, the planet is pushed outside of its (elliptical) orbit, because Newton's gravitation does not counter the increase of centrifugal force.
- When a planet enters faster time, then due to the planet's velocity decrease caused by time dilation alone, it is pulled inside its (elliptical) orbit, because Newton's gravitation overpowers reduced centrifugal force.

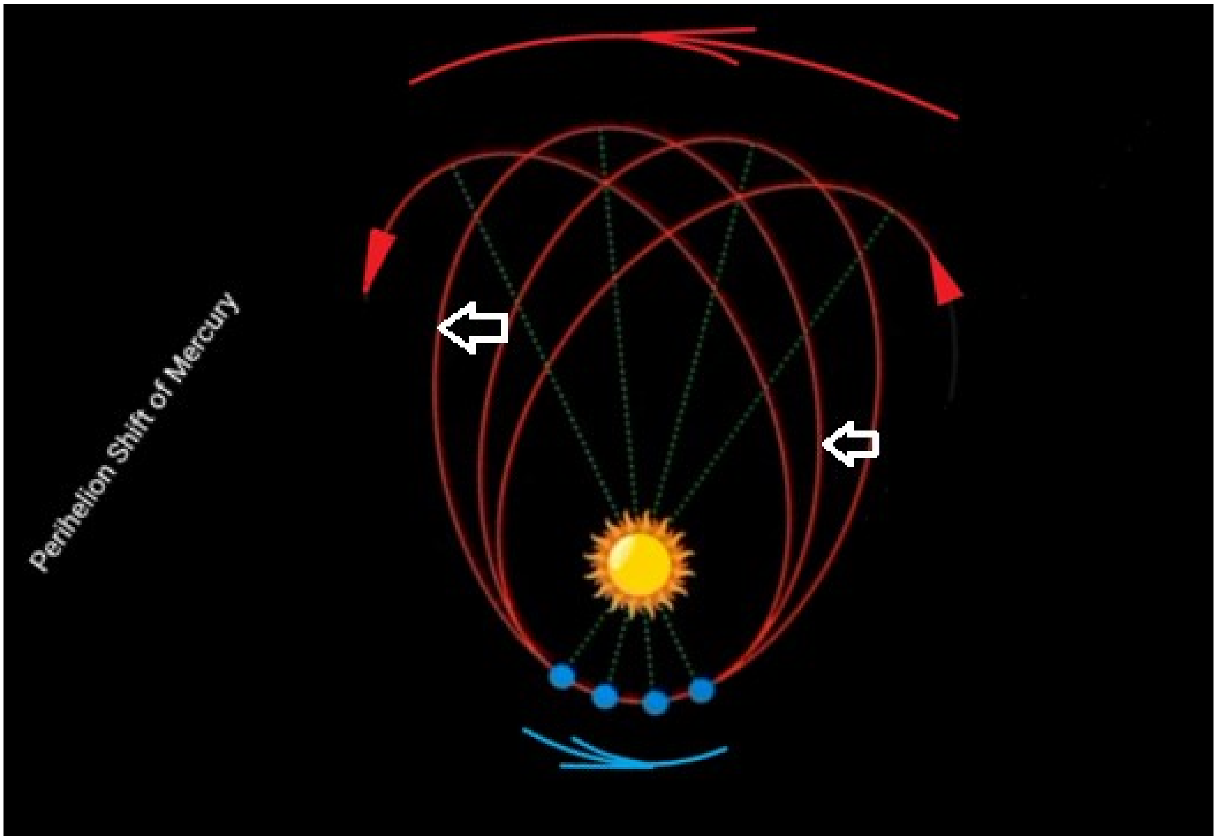
Now we understand what happens on an elliptical orbit, when a planet enters slower time while travelling towards the Sun, and when planet drifts away from the Sun into faster time:



Or if you don’t like talking about fictitious centrifugal force, the same result will be just by the velocities change:


Gravitational force that was enough to retain the planet on the elliptical orbit, now is not enough to return the planet to the ellipse, when planet velocity is increased.
With a reduced velocity the planet will be brought inside the ellipse.

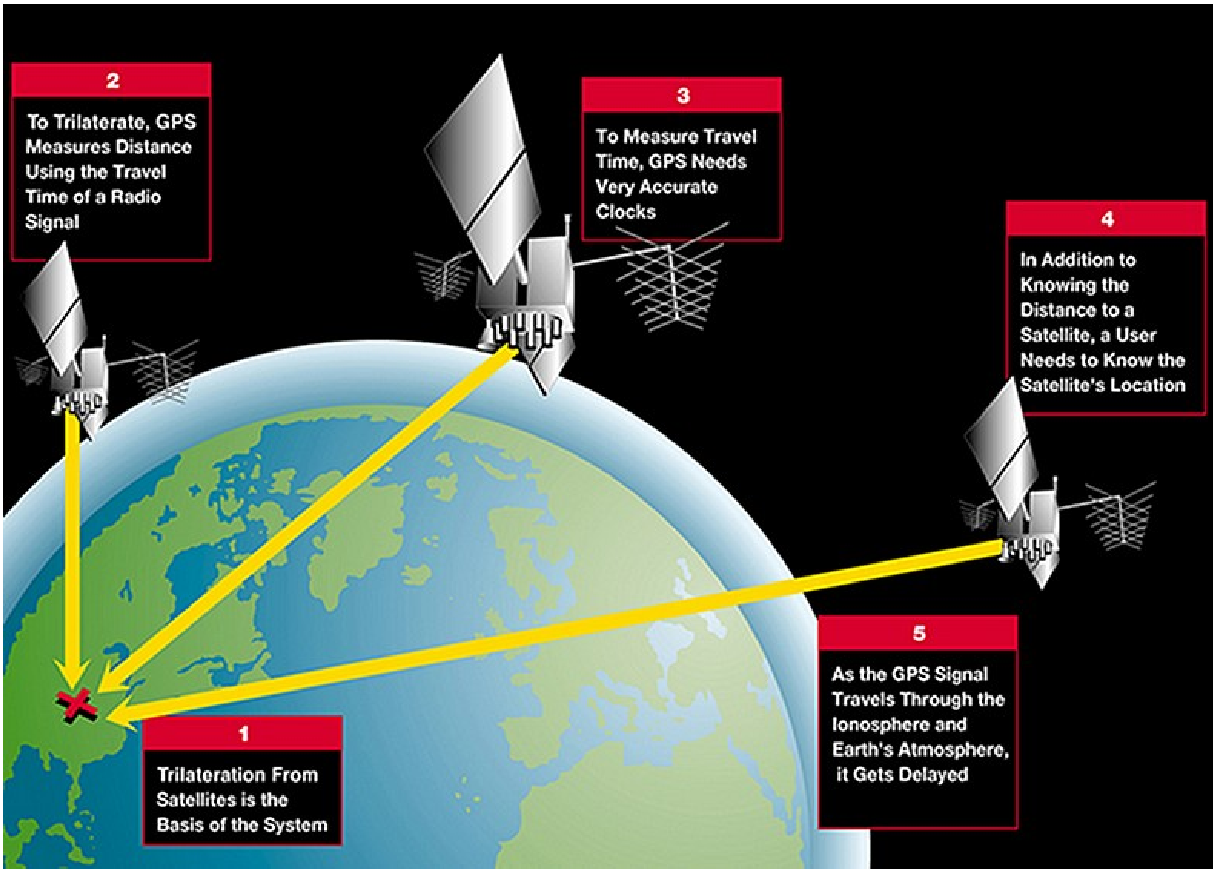
That leads to the orbit tilting (in the white arrows direction), along with apogee and perigee rotation, in the same direction as the planet rotates:



44. MORE ABOUT GPS AND TIME DILATION

Time dilation is written in stone now.

Nowadays everybody knows what GPS is, but several decades ago it was for militaries and airlines only. Quick introduction into the subject from FAA:


2
To Trilaterate, GPS Measures Distance Using the Travel Time of a Radio Signal
3
To Measure Travel Time, GPS Needs Very Accurate Clocks
4
In Addition to Knowing the Distance to a Satellite, a User Needs to Know the Satellite's Location
5
As the GPS Signal Travels Through the Ionosphere and Earth's Atmosphere, it Gets Delayed
1
Trilateration From Satellites is the Basis of the System

from FAA website

Airplanes, advanced military shells, and our smartphones take signals from 3–4 nearest satellites (of the 24 satellites on the orbit) and triangulate the position by deriving distance from each satellite **using time delay** of the received signal. Clocks on the GPS satellites should be extremely precise, because to get the distance from a satellite, time delay is multiplied by the speed of a signal, which is 300,000,000 m/sec. Thus, even one million**th** mistake in time leads to 300-meter error in position. In the early 1980s, despite clocks being very accurate, within the first 24 hours clocks were so off that error in the positioning was hundreds of meters, even miles. Turns out it is because time on the orbit runs faster than on the Earth, the phenomenon known as **Einstein's time dilation**. And although time offset was minuscule (the order of its magnitude was about billion**th** of a second per second), it was accumulated fast, and led to incorrect distance measurements even within the first 24 hours:

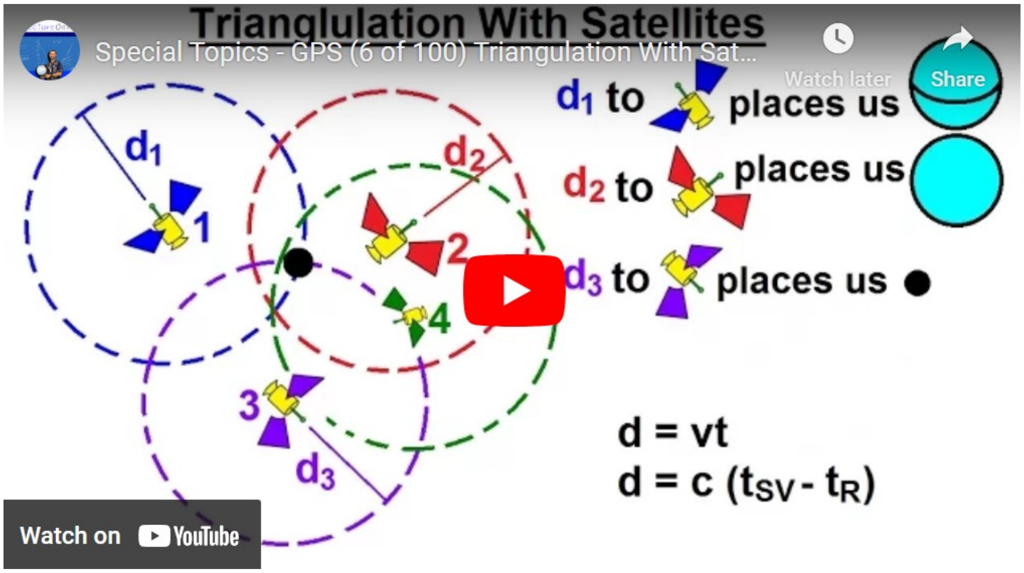
24 hours × 3,600 sec × one billionth time dilation × 300,000 km/sec

= 26 km/day = 16 miles/day error.

Actually, because GPS satellites are not too far from the Earth, time dilation rate is lower than one billion**th**, but even with 1/10 of one billion**th**, error is accumulated by 1.6 miles per day (check real numbers in Chapter 47).

That problem was fixed by making clocks for GPS satellites run a bit slower, so that when they are on the orbit (where time runs a bit faster) they still stay in sync with the clocks on the Earth.

Here is a good explanation on how time delay is used in distance calculation and the need for a 4th satellite signal (due to the error of cheap clocks in receivers):

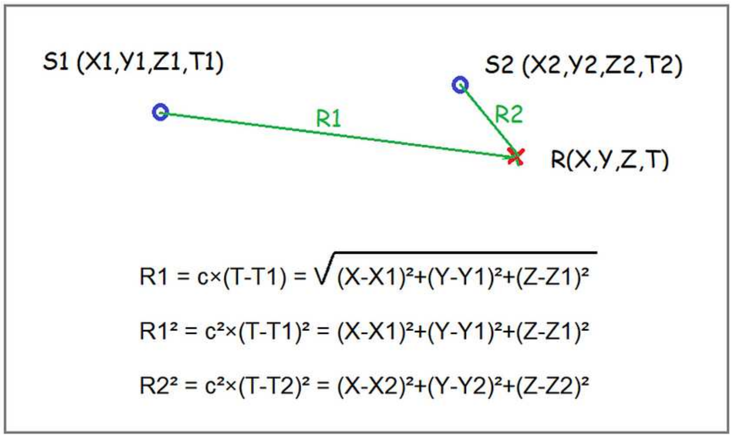


https://youtu.be/QK1IDsinMwk

Now, since any receiver clock is cheap, small and inaccurate, how can local time (of the receiver) be identified so precisely? We cannot carry big atomic clock:

Chapter 44. MORE ABOUT GPS AND TIME DILATION

Let’s consider two satellites S1 and S2, which broadcast their known coordinates (X1, Y1, Z1) and (X2, Y2, Z2), and their known time T1 and T2. And our receiver/smart phone R is ignorant about its own position (X, Y, Z) and its local time T. Distances R1 and R2 from the receiver to the satellites are unknown as well, but there are two known formulas for distance calculation: one is by time taken for the signal to reach the receiver multiplied by c — light speed, another is by Pythagorean formula, which uses coordinates:



$$R1 = c\times(T-T1) = \sqrt{(X-X1)^2+(Y-Y1)^2+(Z-Z1)^2}$$

$$R1^2 = c^2\times(T-T1)^2 = (X-X1)^2+(Y-Y1)^2+(Z-Z1)^2$$

$$R2^2 = c^2\times(T-T2)^2 = (X-X2)^2+(Y-Y2)^2+(Z-Z2)^2$$

To get rid of T^2, X^2, … let’s subtract last two formulas from each other:

$R1^2-R2^2 = c^2\times(-2T1+2T2)\times\mathbf{T}+ c^2\times(T1^2-T2^2) = (-2X1+2X2)\times\mathbf{X}+(-2Y1+2Y2)\times\mathbf{Y}+(-2Z1+2Z2)\times\mathbf{Z}+X1^2+Y1^2+Z1^2-X2^2-Y2^2-Z2^2$

Thus: $c^2\times(-2T1+2T2)\times\mathbf{T}+(2X1-2X2)\times\mathbf{X}+(2Y1-2Y2)\times\mathbf{Y}+(2Z1-2Z2)\times\mathbf{Z}+ c^2\times(T1^2-T2^2)-X1^2-Y1^2-Z1^2+X2^2+Y2^2+Z2^2=0$

Since only **T, X, Y, Z** are unknown, let's rewrite the above equation simpler (using Known* instead of real numbers):

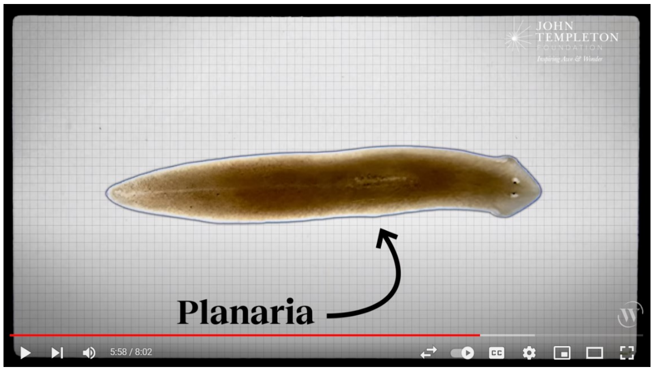
Known1×**T**+Known2×**X**+Known3×**Y**+Known4×**Z**+Known5=0

We got a linear equation with 4 unknowns, using data broadcasted by satellites S1 and S2. Absolutely the same way we can get another linear equation from satellites S1 and S3 data, and another from S1 and S4 data. Let's for a moment use 5th satellite data as well, thus we will have 4 linear equations with 4 variables — that is enough for the receiver computer to solve 4 liner equations and find **T, X, Y, Z**. We used extra 5th satellite data/equation for simplicity — to stay with linear equations only. Actually, 3 linear equations will do, yet not to solve, but to resolve unknown X, Y, Z **via T**. Then the computer can substitute X, Y, Z as **T**-expressions in the very first equation for $R1^2$ (in the image above) and find **T** from that equation.

Thus, our smart phone knows/calculates local time T as precisely as the GPS satellites identify their local time using their atomic clocks.

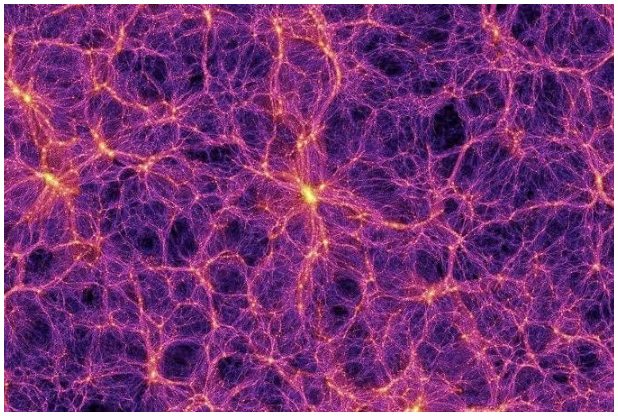
P.S. Long time ago, even great Newton believed in Absolute Time — that time pace is everywhere and always the same. **Not anymore: time dilation is taken into account in modern hardware and software.**

Now we see how a tiny time dilation distorts our impression of a signal origin, despite it reaching us in a fraction of a second. It becomes clear how off astronomers could be about our Universe origin based on light signals travelling to us billions of years from the time that was many times dilated compared to the current time. But even Planaria can change its mind radically in just two weeks:

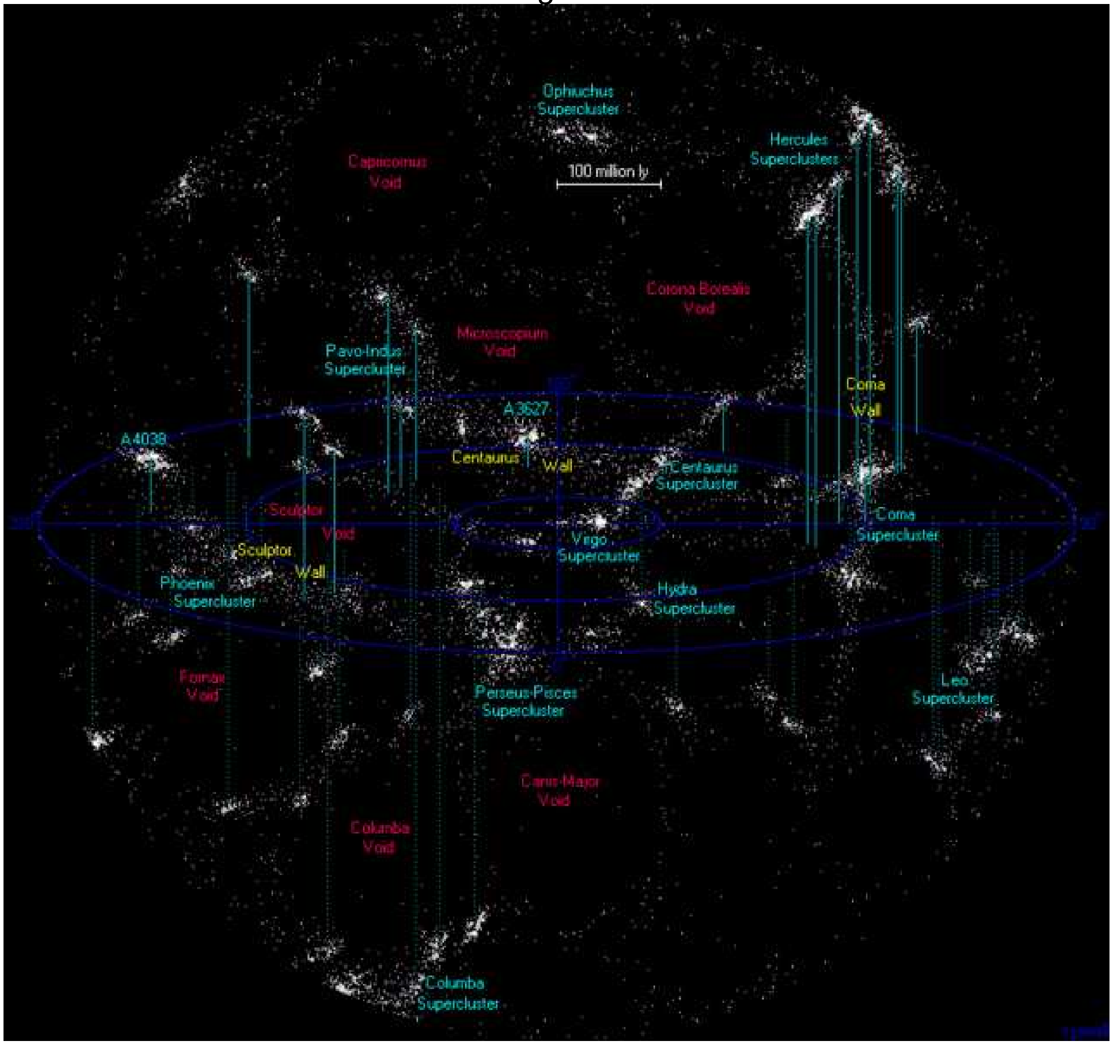


https://www.youtube.com/watch?v=0a3xg4M9Oa8&t=357s

45. COSMIC WEB: REAL AND ILLUSION



There are galactic filaments in the emptiness of our Universe. Astronomers even put names on the observed galactic clusters and voids:

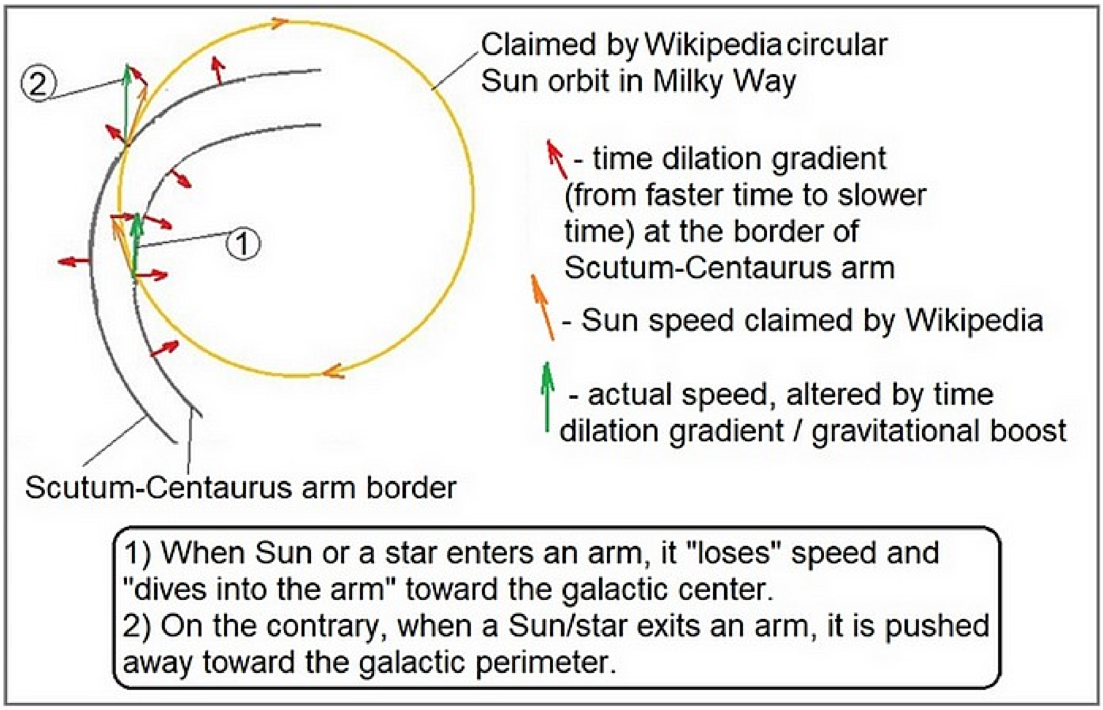


https://en.wikipedia.org/wiki/File:Nearsc.gif

Is it puzzling or natural to see such unevenness in galactic distribution? It would be puzzling from a mere perspective of classic gravity: mainstreamists claim that all galaxies should be (or on their way to) either dispersing into emptiness or vice versa — all collapsing together. That is wrong and it is not what we see. Have we seen similar unevenness closer? Yes, we have: in our Milky Way.

https://www.youtube.com/watch?v=6Xy1CMrxLkI

And what is the reason for the uneven distribution of stars in our Milky Way (or any other spiral galaxy)? It is the unevenness of time: time in spiral arms runs a bit faster than outside the arms. Time difference, or time dilation by Einstein, is the cause of gravity (even mass causes time dilation around it first, and that causes gravity). In spiral arms it works this way:

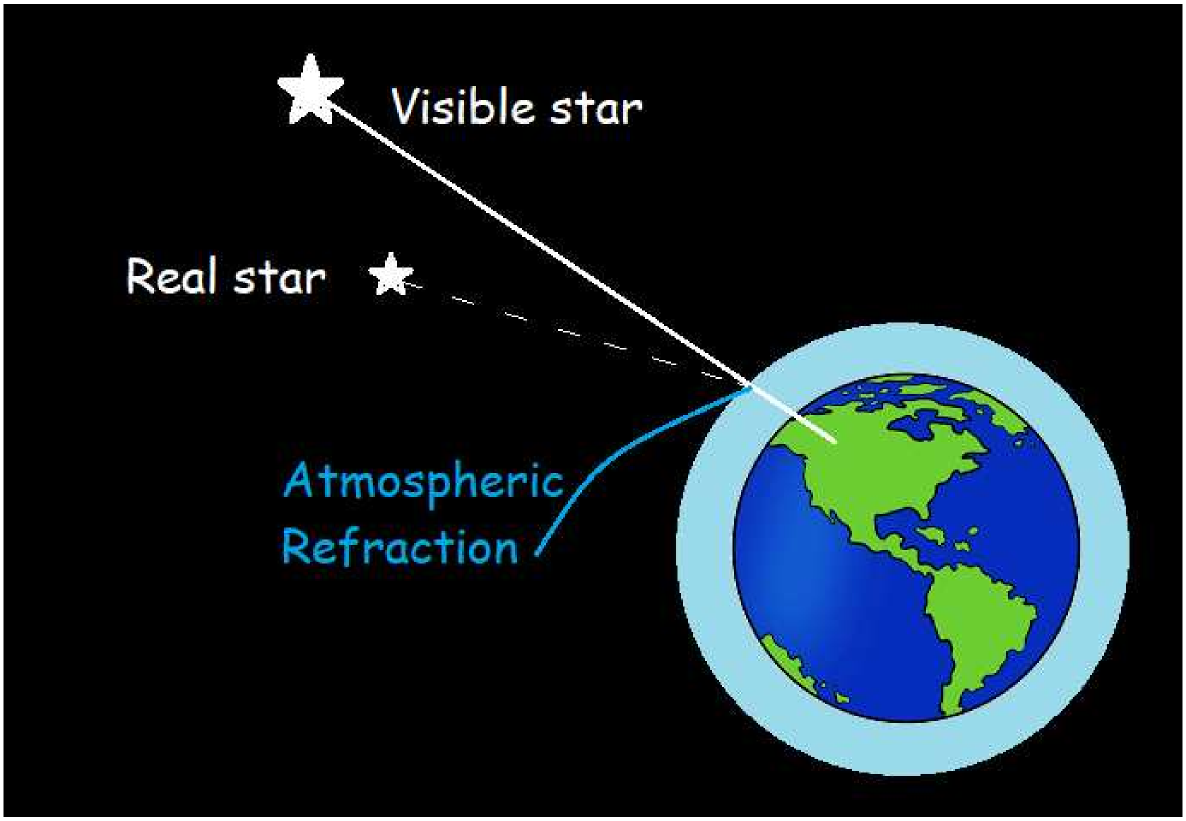

Claimed by Wikipedia circular Sun orbit in Milky Way
②
①
- time dilation gradient (from faster time to slower time) at the border of Scutum-Centaurus arm
- Sun speed claimed by Wikipedia
- actual speed, altered by time dilation gradient / gravitational boost
Scutum-Centaurus arm border
1) When Sun or a star enters an arm, it "loses" speed and "dives into the arm" toward the galactic center.
2) On the contrary, when a Sun/star exits an arm, it is pushed away toward the galactic perimeter.

And there are 3 outcomes, which make arms bright:

- **Jammed:** Stars are inclined to move along arms, like cars entering highway along green arrow 1, and stars are pushed away from the condensed traffic when exiting by green arrow 2.
- **Brighter:** Stars burn a bit faster in arms, because time is faster there.
- **More:** Stars that are on the burning/not burning brink are switched on when entering an arm and switched off when leaving the arm (astronomers confuse such stars for newly born at an arm border, short lived in the arm, and dead on exiting the arm).

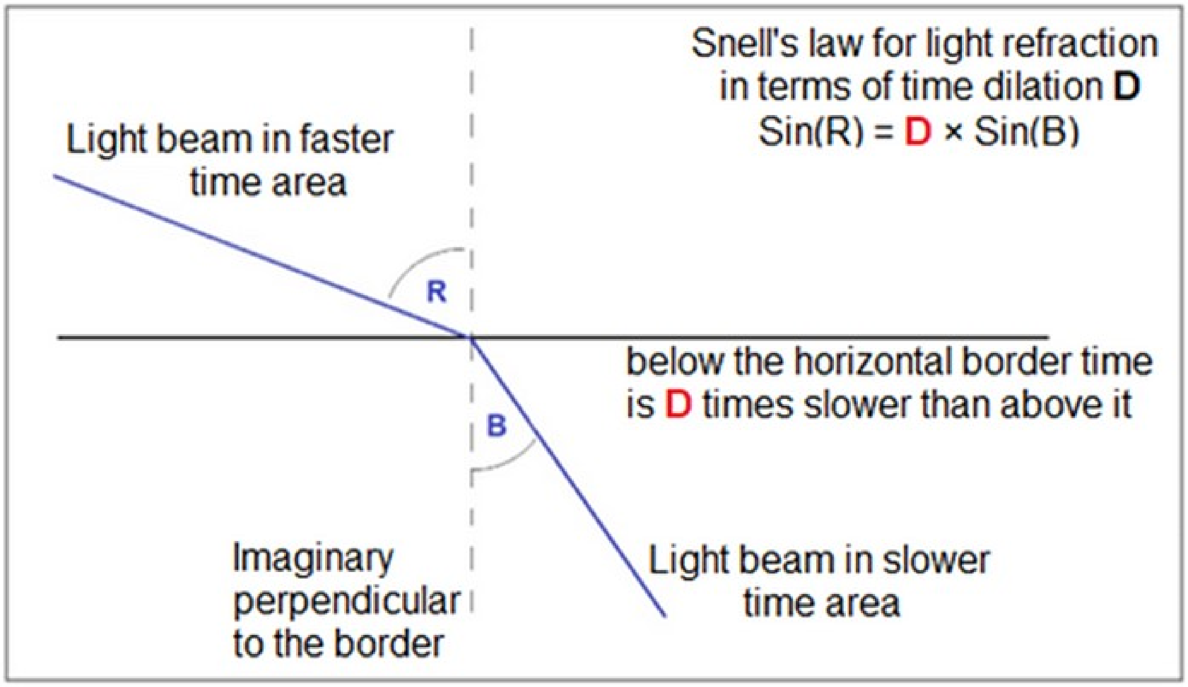
Absolutely the same effects of time dilation are observed at the scale of the Universe: **there are faster time highways for galaxies. Thus, the Cosmic Web is real, because of physical effects of time dilation. But that is a half of the story.**

Let's talk about optical illusions, starting with a well-known one. Astronomers are well aware of the atmospheric refraction that shifts stars observation:



We experience the same effect of the atmospheric refraction when we see the Sun jumping out of the horizon during sunrise, and sinking fast during sunset: at lower levels of the atmosphere the air is denser, and the refraction is stronger there. Because of that, we see the Sun even below the horizon at an early sunrise and a late sunset.

Exactly by the same Snell's law describing refraction, time dilation causes refraction as well:


Snell's law for light refraction
in terms of time dilation D
Sin(R) = D × Sin(B)
Light beam in faster time area
R
B
below the horizontal border time is D times slower than above it
Imaginary perpendicular to the border
Light beam in slower time area

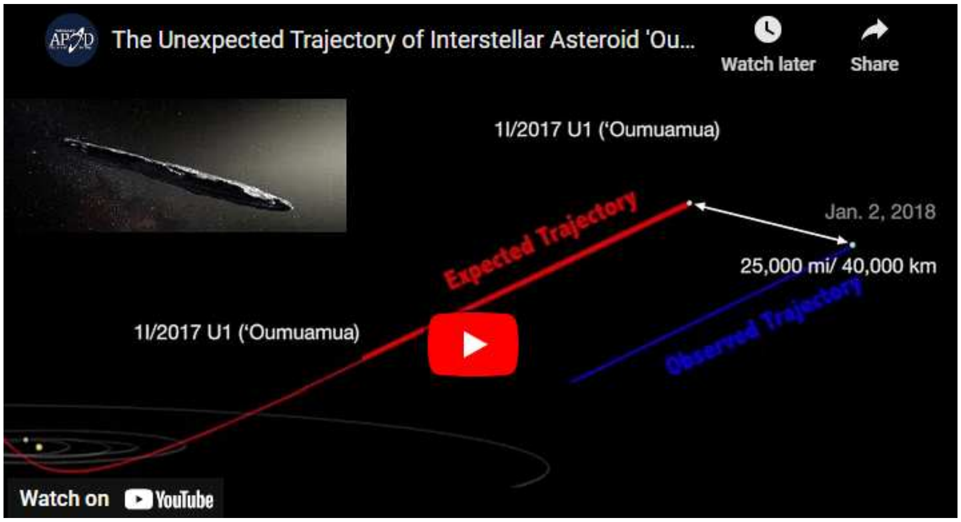
The Milky Way and the Universe are filled with uneven time, we see faster time areas in spiral galaxies as arms, and as Cosmic Web filaments in the Universe. Absolute time, which is time running at the same pace everywhere and always, exists only as local approximation.

To the optical illusion part: we see the Universe through the lens of the Milky Way and through the medium/ether of uneven time, which fills the Universe, refracting light on its way. It is like looking outside not through a flat-glass window, but through a wavy crystal vase or a glass brick wall:

Astronomers are very well familiar with an optical distortion called gravitational lensing. Besides this kind of convex lensing, there is an opposite concave lensing effect caused by our time running faster than in the past: remote galaxies appear to us closer and smaller, by concave refraction. And now, there are various wavy refractions along the line of sight (which is not a straight line any more, because line of sight is not the shortest path, but the fastest path, meaning longer but faster-time routes can be taken. And besides the fastest line of sight, there could be alternative/mirrored paths/images, which were observed even through gravitational lensing.) **The Cosmic Web, as we see it, is partially an illusion/distortion caused by optical effects of time dilation.**

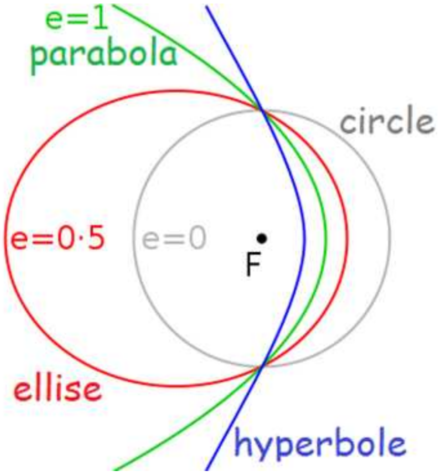
46. INTERSTELLAR TRAVELER OUMUAMUA MYSTERY SOLVED

2017 interstellar asteroid Oumuamua, which means "a messenger from afar arriving first", made big headlines because its trajectory "violated gravitational laws". Oumuamua, on its way out of Solar system, had a higher-than-expected velocity, and its trajectory shifted outside of the expected hyperbolic trajectory:



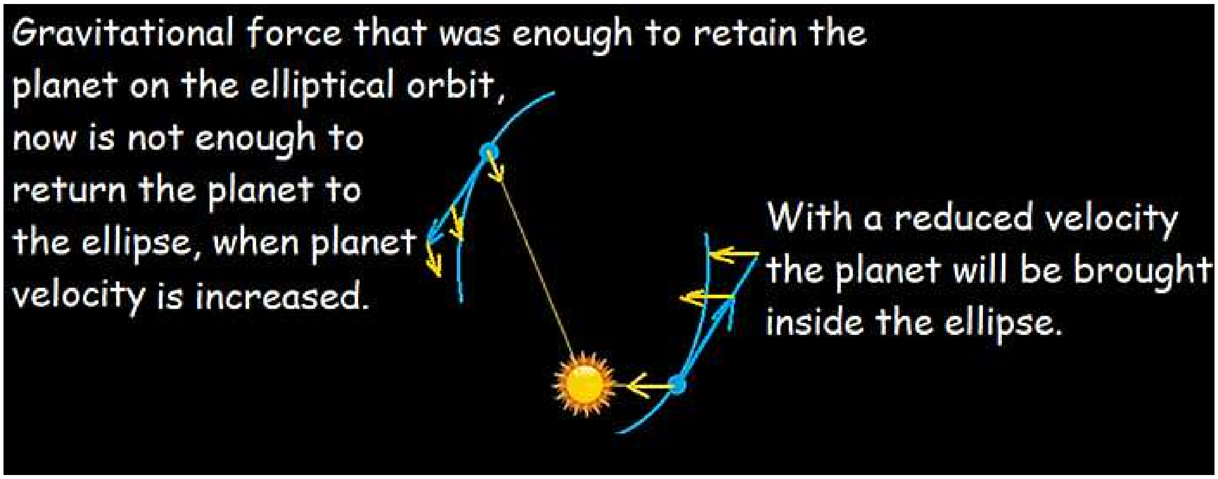
https://www.youtube.com/watch?v=fdfD-Bj2RBE

Newton's gravitational force F (between masses m and M at distance R by formula F=G×m×M/R², where G is some constant) is responsible for circular and elliptical planetary (and asteroids') orbits, and for parabolic and hyperbolic trajectories of asteroids:

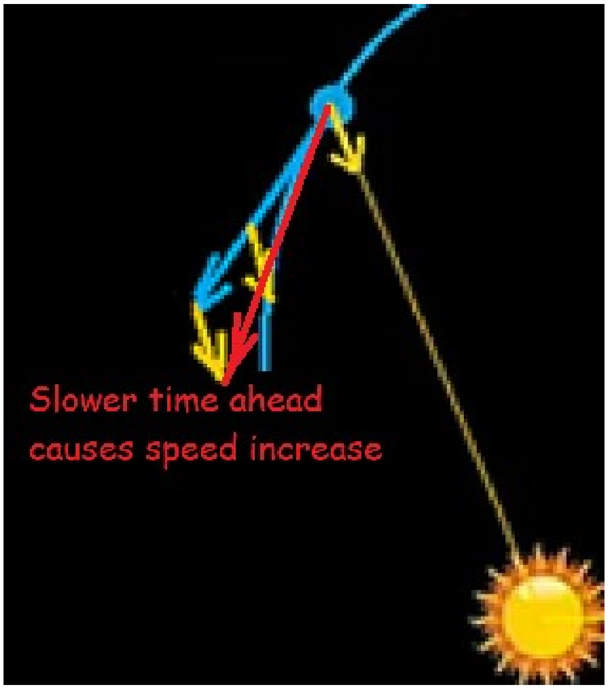


https://en.wikipedia.org/wiki/File:OrbitalEccentricityDemo.svg

Amazingly, the Oumuamua problem is very similar to the well-known Mercury's precession problem discovered by U. Le Verrier in 1859 and solved by Einstein in 1915. In chapter 43 we discussed a simple solution for the Mercury's problem:


Gravitational force that was enough to retain the planet on the elliptical orbit, now is not enough to return the planet to the ellipse, when planet velocity is increased.
With a reduced velocity the planet will be brought inside the ellipse.

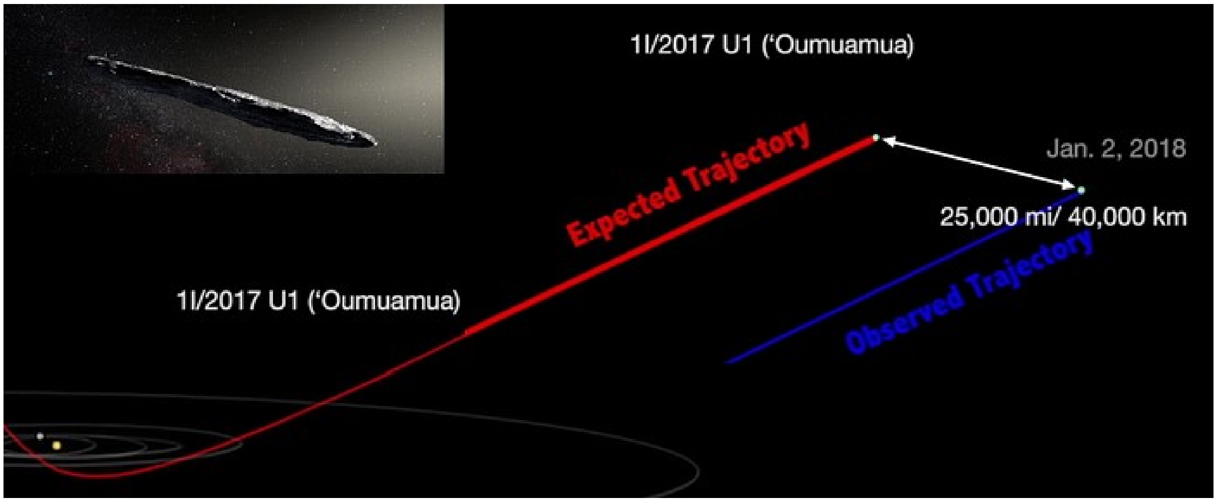
As we can see, the direction of deviation from a classic (in blue) trajectory depends only on whether time ahead of the object slows down or speeds up. If the object **heads into slower time, then speed of the object increases** compared to the speed by Newton's laws just because of time dilation effect, and the object shifts outside of the expected classic orbit (does not matter elliptical or hyperbolic):



Adjusted position at the red arrow tip, outside the classic orbit

In the case of Mercury, slower time happens to be closer to the Sun ("gravitational time dilation"). Rate of time dilation around the Sun is about 2 million**th** (for 1 second passed on the Sun surface, 1.000002 seconds pass far away from the Sun, for example, on the Earth). But with Oumuamua trajectory there is an opposite and stronger time dilation effect to consider: time flow outside the Milky Way arms is slower than time flow inside the arms, approximately by the factor of 1.001 (see explanation in chapter 2). Our Solar system is in the **Orion Spur of the Sagittarius Arm** at the moment, and Oumuamua was leaving not only the Solar system, but Orion Spur and the Milky Way's plane as well. Thus, it headed in the direction of slower time with the factor of 1.001, and that factor overpowers 1.000002 time-speeding factor (caused by leaving the slower time zone with the factor of 1.000002 in vicinity of the Sun).

Time speed/dilation variation caused by leaving the arm (+0.001) is 3 orders of magnitude stronger than the opposite effect (—0.000002) on time speed caused by leaving the Sun. Thus, slower time outside of the galactic spur/arm/plane solves the problem of the asteroid's increased velocity and the trajectory shift "outside" (gravitational force by Newton's formula does not compensate for the velocity increase):



https://www.youtube.com/watch?v=fdfD-Bj2RBE

47. LOW-COST MARINE BUOYS VS. EXPENSIVE GPS SATELLITES

In Chapter 44 we discussed how time dilation is “written in stone” in modern technologies. Let’s elaborate on the magnitude of time flow discrepancies on the Earth and on GPS satellites. Two known causes for time dilation (time slowing down): gravitational time dilation, which happens near massive objects like the Earth, and relativistic time dilation, which happens in fast moving objects (like on the Earth surface, which spins around its axis at about 1,000 miles per hour). Formula for gravitational time dilation

sqrt(1–2GM/Rc²) ~ **1–GM/Rc²,**

where M is the Earth’s mass and R its radius, means that for 1 second of time passed far from the Earth, **1–GM/Rc²** seconds pass on the Earth surface (time slows down because of the Earth’s mass).

GPS satellite orbit's radius is about 4 times the Earth's radius, therefore, for 1 second of time passed far from the Earth, **$1 - GM/4Rc^2$** pass on the satellite. Thus, gravitational dilation difference between on the GPS orbit and on the Earth is:

$(1 - GM/4Rc^2) - (1 - GM/Rc^2) = ¾$ **GM/Rc^2**.

Relativistic time dilation caused by high velocity of the Earth surface spinning, or high velocity of GPS satellites rotation, the formula is:

$\mathrm{sqrt}(1 - v^2/c^2) \sim$ **$1 - 0.5v^2/c^2$**.

Earth surface velocity v comes from a 24-hour Earth's rotation period:

$v = 2\pi R/(24\times3600)$.

GPS satellite period is about 12 hours, so on its 4R radius orbit, velocity v is: $v = 8\pi R/(12\times3600) = 16\pi R/(24\times3600)$.

Thus, relativistic dilation difference between inside the GPS satellite and on the Earth's surface is:

$1 - 0.5(16\pi R/(24\times3600))^2/c^2 - (1 - 0.5(2\pi R/(24\times3600))^2/c^2) = -127\pi^2R^2/(24\times3600\times c)^2$.

Combined difference of gravitational and relativistic time dilation is:

$¾\ GM/Rc^2 - 127\pi^2R^2/(24\times3600\times c)^2$.

With $G = 6.67/10^{11}$, $M = 5.97\times10^{24}$, $R = 6.37\times10^{6}$, $c = 3\times10^{8}$, $\pi = 3.14$, the result is:

$5.2/10^{10} - 0.75/10^{10} =$ **$0.445/10^{9}$, which is about half nanosecond. That means for 1 second passed on the Earth, 1.000000000445 seconds pass inside a GPS satellite. Relativistic effect $-0.75/10^{10}$ is much less than gravitational effect $+5.2/10^{10}$.**

If not accounted for such difference in time flow, the error in location triangulation is $0.445/10^{9}\times c = 0.445/10^{9}\times300{,}000{,}000$ m/sec = 0.133 m/sec, and in one day the error accumulates to 0.133 m/sec×24×3600 sec ~ 11.5 km/day ~ 7 miles/day => 350 km/month, and so forth …

An alternative to such an expensive and sophisticated GPS system of 24 satellites with big atomic clocks and powerful power sources on the board to maintain continuous broadcasting for many years, delivered to a very high orbit, is a marine buoy: no problems with huge weight to deliver on high orbit, no time dilation (the buoy is on the Earth's surface), no problems with maintenance. Buoys do not even need atomic clocks, because the same chip that is used in our smartphones can derive precise local time. And they do not need to broadcast continuously every/every other second. They can be engaged remotely when needed only — sending a response to a request, a response that is a powerful transmission overpowering any noise/interference around. To avoid a horizon between the receiver and the transmitters, the receiver should be elevated and the transmitters should be not far away: for a receiver at 100 meters (330 ft.) above sea level, the transmitter(s) should be no farther than 36 kilometers (22 miles) from the receiver.

Transmitters can be elevated too: there are 5,000 lightweight Starlink/SpaceX satellites at 500-kilometer low orbit, they are transceivers: radio transmitters and receivers combined. They can receive GPS satellite transmissions, recalculate local time and current position (like our smartphones do) and retransmit altered signals.

Do GPS satellites actually need atomic clocks on board? Why not use a few dozen ground or ocean-based stations broadcasting their atomic time and location, and GPS satellites computing their time and location, like smartphones do? At a 4R-radius orbit, the horizon should not be a problem. Primary transmitters on the Earth → GPS satellites as transceivers → everything else as receivers.

P.S. For those who wonder where these approximations come from

$\mathrm{sqrt}(1-2GM/Rc^2)$ **$\sim 1-GM/Rc^2$** and $\mathrm{sqrt}(1-v^2/c^2)$ **$\sim 1-0.5v^2/c^2$**.

From the Taylor series: $f(1+X) = f(1) + f'(1)\times X + f''(1)/2!\times X^2 + f'''(1)/3!\times X^3 + \dots$

For small values X: $f(1+X)$ **$\sim f(1) + f'(1)\times X$** – the rest is ignored as X^2 – small.

For the function $f(x) = \mathrm{sqrt}(x)$, $f'(x) = 1/2 / \mathrm{sqrt}(x)$, and $f'(1) = 0.5$.

For $X = -2GM/Rc^2$: **$\mathrm{sqrt}(1-2GM/Rc^2) \sim$** $f(1) + f'(1)\times(-2GM/Rc^2) =$ **$1 - GM/Rc^2$**,

and for $X = -v^2/c^2$: **$\mathrm{sqrt}(1-v^2/c^2) \sim$** $f(1) + f'(1)\times(-v^2/c^2) =$ **$1-0.5v^2/c^2$**.

48. WHERE DOES ENERGY COME FROM AND GO TO? - TIME!

Let us summarize what we have learned about time and energy. From school we know that when a car is accelerated, the chemical energy of gasoline burning or the electric energy from lithium batteries goes into the kinetic energy of the car **$mv^2/2$**, right? From Einstein we know a couple of things more:

- Even not moving object contains **mc^2** energy inside it.
- Nothing can be accelerated to the speed of light **c**.

“Nothing can be accelerated to the speed of light **c**” because it will require infinite energy to do so, even for a particle, even more so for a car, why? According to the **$mv^2/2$** formula, the energy required for getting to **c**-speed is finite **$mc^2/2$**. However, Einstein found that **$mv^2/2$** formula is correct only for velocities much smaller than **c**. The energy formula changes with high velocities because time inside sped up objects slows down, and energy is very sensitive to time: even **Joule** energy unit strongly depends on time, $\textbf{Joule}=\text{kg}\times\text{m}^2/\textbf{sec}^2$. If we denote rate of time dilation as **D**, meaning **$D=2$** if time slows down twice (for 1 second outside the object, 0.5 seconds pass inside the object), then the actual energy formula for any object, moving or stationary, is **$mc^2(D+1/D)/2$**. How does time dilation **D** depend on velocity? Einstein’s formula for that is **$D=1/\text{sqrt}(1-v^2/c^2)$**, where sqrt denotes square root. By this formula, if velocity of the object is half the speed of light, then for 1 second outside this object, **$\text{sqrt}(1-(c/2)^2/c^2) = \text{sqrt}(3/4)=0.866$** seconds pass inside that moving object. AND if velocity **v** comes close to **c**, then **$D=1/\text{sqrt}(1-v^2/c^2)$** comes close to infinity = 1/0, meaning time inside such an object not runs but crawls. And if **D** becomes close to infinity, then **$mc^2(D+1/D)/2$** energy comes close to infinity.

We can see now that all energy that goes into an object acceleration, from its initial **mc^2** to **$mc^2(D+1/D)/2$** energy, actually goes not into changing its velocity, but into slowing time inside the object. And slowing a second down even by a nanosecond requires a lot of energy (see below). That gives you a time perspective on kinetic energy, but what about potential energy?

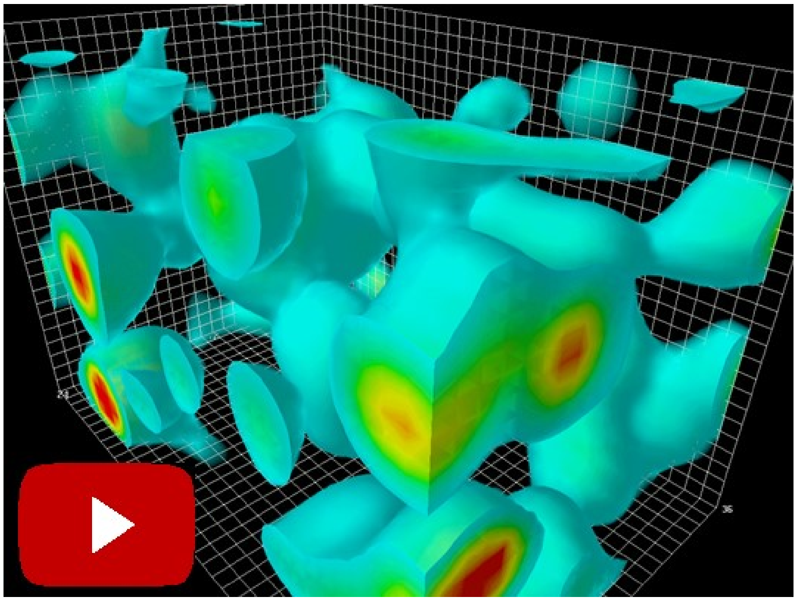
It is even more so for potential energy: why do we need energy to jump, or why do we burn thousands of tons of fuel to put satellites in orbit? It is because a second on the Earth surface is about a nanosecond slower than away from the Earth. Check real numbers in the previous chapter: 1.000000000445 seconds pass in a GPS satellite, in 1 Earth-second, with (potential) gravitational effect on time stronger than (kinetic) relativistic time dilation.

And in chapter 11 we discussed that even matter comes from time — as residue from time burning.

P.S. Is it strange that mainstream physicists acknowledge that c-speed is unachievable for any object because it takes infinite energy to slow time down to almost stopped time in such an object, but the same mainstreamists do not understand that it takes infinite energy to create a theoretical Black Hole, where time slows down to stop? “Nearly black holes” with slow (but not stopped) time do exist, and we have images of those. But neither real Black Hole nor Event Horizon, where time stops and nothing can escape from, is possible by the energy conservation principle. Einstein attributed Black Hole conundrum to a math mistake yet to be found (at that time). Kudos to Dr. Vivian Robinson, who has found it as a math rounding mistake. Check details in chapter 24.

49. ONE PAGE DIGEST ON TIME PHYSICS

Time is neither abstraction nor perception. Some say it is about motion, but not exactly. Physically, **Time is Quantum Fluctuations like Temperature is Brownian Motion.** Quantum Fluctuations fill-in space everywhere outside, and everywhere inside atoms and particles. Play Quantum Fluctuations illustration from Wikipedia:

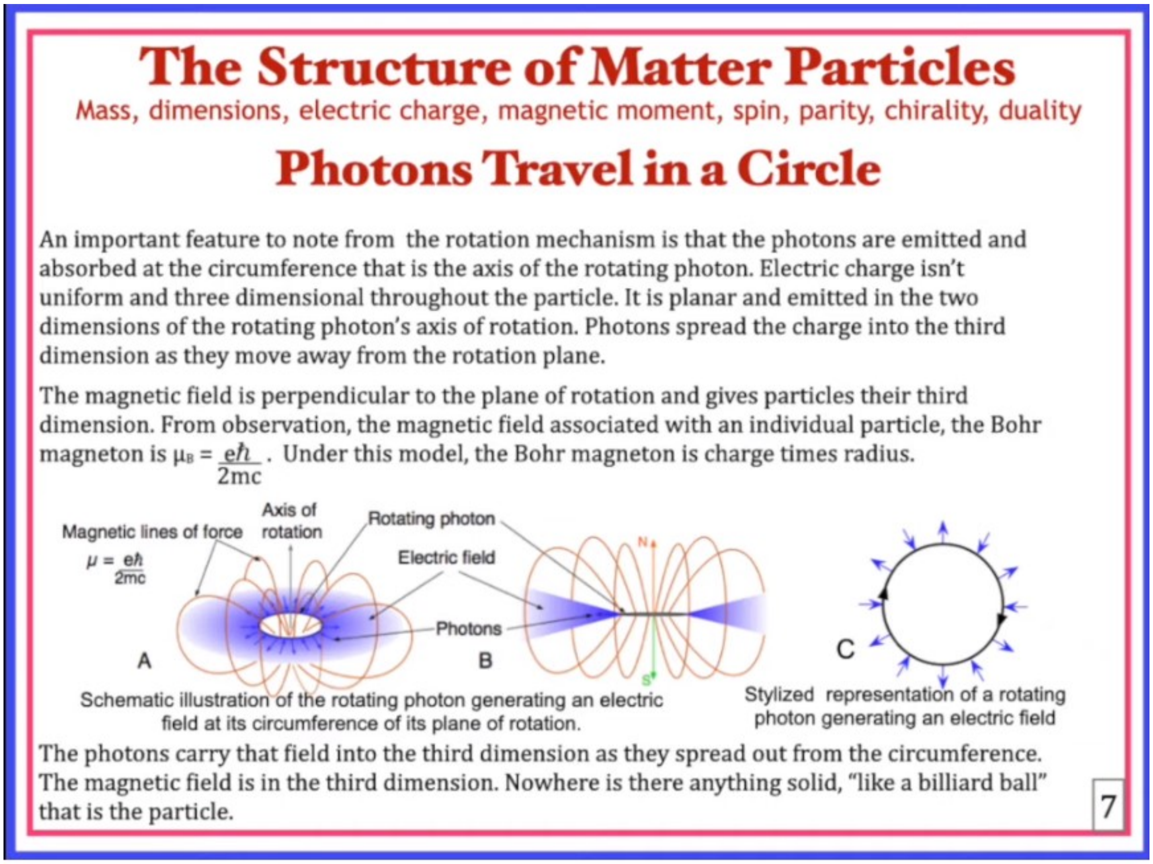


We do not see these fluctuations like we did not see bacteria, viruses, atoms, or particles. **Time as Quantum Fluctuations is like a heartbeat of a CPU as physical time/clock for a computer, or like a pulse as physical time/clock for our body.** We feel many effects of time, one of which is **gravity, which is time pressure** on each and every atom of our body: each atom gets pressured more from the above than from the below by these quantum fluctuations. Such a difference in time flow/speed is known as "gravitational time dilation" near massive objects like our Earth. More details in Chapter 18.

Besides that, **every particle or atom is a bead of slow time, contained by the pressure of faster time from outside**. Physics of such containment well explained in Chapter 27. Mainstream calls that strong force, but Bob Lazar calls it "gravity A (**A**tomic)" vs. usual gravity B (**B**ig). The only difference is in **time dilation** rates, which are **huge in microworld** and fairly **small in macroworld**.

50. MICRO-IDEA ON ANTIMATTER WHEREABOUTS

In Chapter 5 we looked at the statistical explanation of abundance of matter and antimatter Universes, not just our single Universe. But now I'd like to suggest a micro-idea vs. Chapter 5 macro-idea on antimatter whereabouts, based on what we have learned about time and based on Dr. Vivian Robinson "Structure of Matter" (as trapped / confined photons):



The Structure of Matter Particles

Mass, dimensions, electric charge, magnetic moment, spin, parity, chirality, duality

Photons Travel in a Circle

An important feature to note from the rotation mechanism is that the photons are emitted and absorbed at the circumference that is the axis of the rotating photon. Electric charge isn't uniform and three dimensional throughout the particle. It is planar and emitted in the two dimensions of the rotating photon's axis of rotation. Photons spread the charge into the third dimension as they move away from the rotation plane.

The magnetic field is perpendicular to the plane of rotation and gives particles their third dimension. From observation, the magnetic field associated with an individual particle, the Bohr magneton is $\mu_B = \frac{e\hbar}{2mc}$. Under this model, the Bohr magneton is charge times radius.

Schematic illustration of the rotating photon generating an electric field at its circumference of its plane of rotation.

Stylized representation of a rotating photon generating an electric field

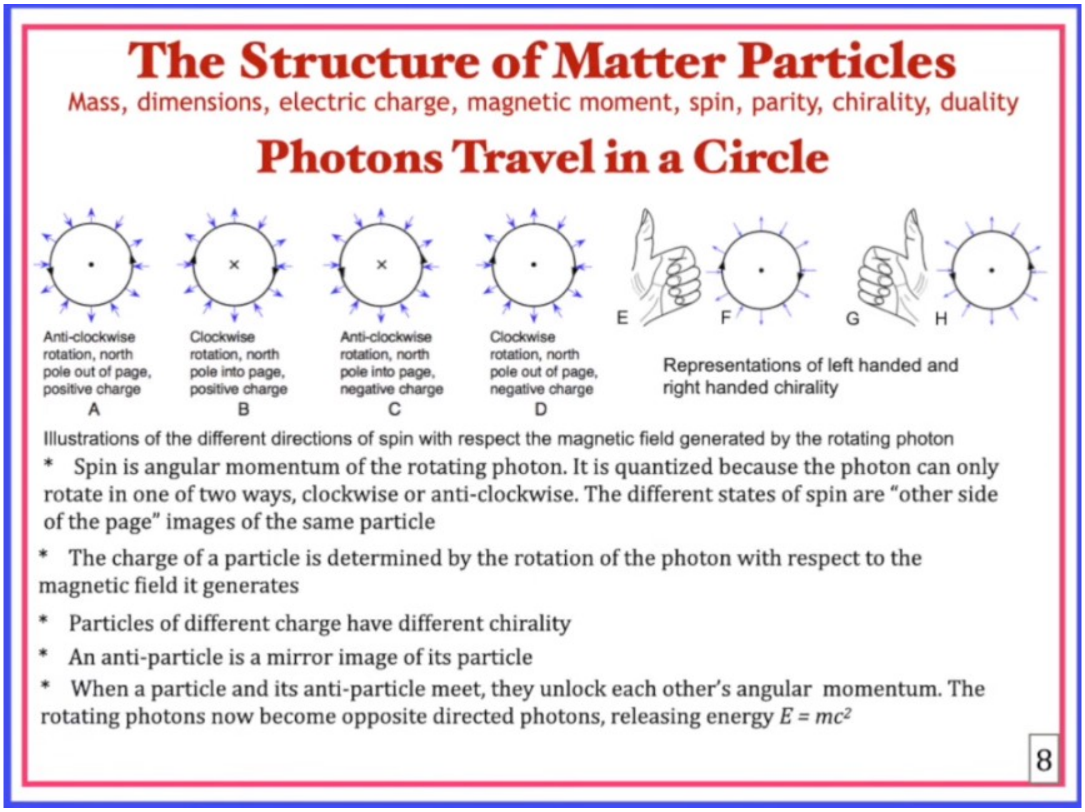
The photons carry that field into the third dimension as they spread out from the circumference. The magnetic field is in the third dimension. Nowhere is there anything solid, "like a billiard ball" that is the particle.

7

QC0021: Dr. Vivian Robinson: Photons, Particles, Matter, and Relativity

https://www.youtube.com/watch?v=BdaGypBI4Aw&t=1140s

In chapters 43 and 46 we saw how classic balanced trajectories of stellar objects are set off by time dilation. And we learned that time in the Universe speeds up, because it burns into matter, antimatter, and photons. And particles are beads of slow time where photons are trapped. And the barrier that holds them is time dilation (the larger time speed difference between inside particles and outside in space, the stronger the barrier is). In Dr. Robinson's image above, there is a flux of field over the particle border. What if this flux, balanced at static times, reacts differently on time speeding up in space for particles and antiparticles? — Since particles differ from antiparticles at their “borders only” (by spin, chirality, …):



The Structure of Matter Particles

Mass, dimensions, electric charge, magnetic moment, spin, parity, chirality, duality

Photons Travel in a Circle

Anti-clockwise rotation, north pole out of page, positive charge
A

Clockwise rotation, north pole into page, positive charge
B

Anti-clockwise rotation, north pole into page, negative charge
C

Clockwise rotation, north pole out of page, negative charge
D

Representations of left handed and right handed chirality

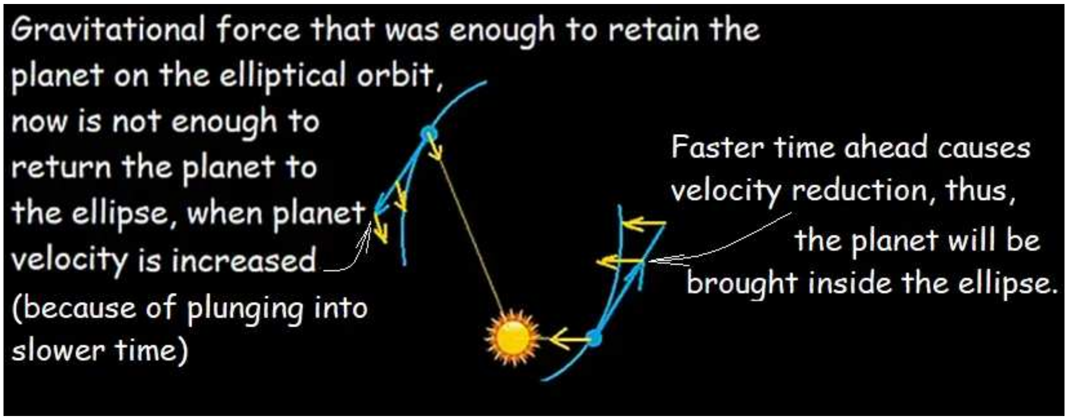
Illustrations of the different directions of spin with respect the magnetic field generated by the rotating photon

- Spin is angular momentum of the rotating photon. It is quantized because the photon can only rotate in one of two ways, clockwise or anti-clockwise. The different states of spin are “other side of the page” images of the same particle
- The charge of a particle is determined by the rotation of the photon with respect to the magnetic field it generates
- Particles of different charge have different chirality
- An anti-particle is a mirror image of its particle
- When a particle and its anti-particle meet, they unlock each other’s angular momentum. The rotating photons now become opposite directed photons, releasing energy $E = mc^2$

8

https://www.youtube.com/watch?v=BdaGypBI4Aw&t=1165s

What if such flux pumps or leaks time between outside and inside: more to inside for particles, more to outside for symmetric antiparticles. And it is happening when / because of space time speed change. Kind of similar to chapter 43 macro-idea, which resolved Newton’s precession vs. regression insight via time speed change:



Gravitational force that was enough to retain the planet on the elliptical orbit, now is not enough to return the planet to the ellipse, when planet velocity is increased (because of plunging into slower time)

Faster time ahead causes velocity reduction, thus, the planet will be brought inside the ellipse.

Any particle, which pumps time inside, strengthens its time dilation border. On the contrary, its counterpart antiparticle, which leaks its time outside, weakens its time dilation barrier, and it will decay as described in chapter 27. Leaking and pumping time between particles and space should not impact the general trend of space time speeding up: time is still burning, and matter / antimatter is still generated.

Just food for thought, for particle physicists to ruminate on and to validate, explaining antimatter decay in accelerating (thus asymmetric) space time: whatever decays is antimatter, vs. remaining / strengthened counterparts as matter. And we do not have the infamous 14-billion-year-cap on such decay anymore. All it takes — pressure and time. Survival of fittest (in accelerating time) particles!

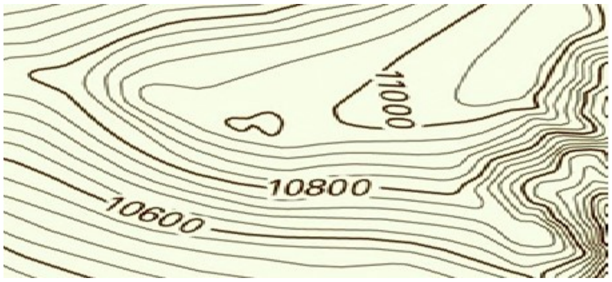
51. GALAXIES, NOT THE BIG BANG, ARE BIRTHPLACE OF MATTER

Or how did galaxies appear?

> *"If I had an hour to solve a problem, I'd spend 55 minutes thinking about the problem and five minutes thinking about solutions."*
>
> *Albert Einstein*

Here we will answer what happened instead of the Big Bang, but let's start with the right question: **1) "Was there motion in the matterless Universe?"** when there was only space and time, and nothing else. Or let me put it in another way: "**What was moving there, if anything at all?**"

ESA (European Space Agency) has an infrared telescope in space that takes snapshots of wider areas than Hubble and James Webb telescopes focus on. With these snapshots, redshift variations are measured in vast areas of space and the astronomers compile space contour maps similar to relief contour maps:

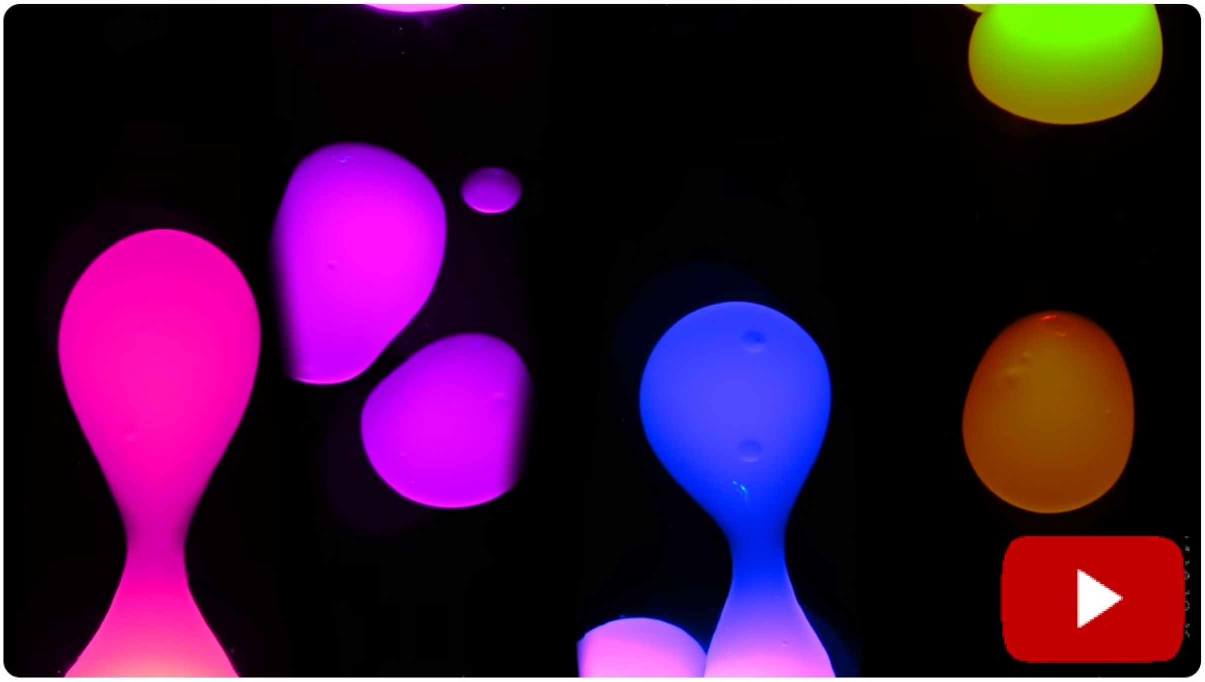


What is measured by the redshift level Z is time dilation D (since D=Z+1) in these areas of space. Usually, these values and variations are small. Even in our Milky Way and other spiral galaxies, we know that time in spiral arms runs at about 0.001 rate faster than outside the arms, meaning time outside the arms is dilated with D of about 1.001 or with redshift Z of around 0.001. But now, with James Webb piercing into the deep past of our Universe, we see areas with redshift values 15–20, thus, time dilation 16–21. To make a long story short, when there was no matter in the Universe (check the images in Chapter 5) there were blobs of slow and slower time inside fast and faster time. It is due to Einstein's "Time is not Absolute" principle, somewhere it is slower, somewhere it is faster. Imagine having an ancient map of the Universe with slower time areas darker and faster time areas lighter, with various shades of grey. Now, would such a map be static, or will it be dynamic, meaning there is movement? Another basic Einstein's principle is "Nothing is motionless", except for an observer observing only himself. Map was changing, and blobs were moving. But still, there was nothing but areas of time moving around. First question answered.

Next question: **2) "Was there a speed limit?"**. And remember – there was no light then.

When Maxwell came out with the speed of light **c** (which is 299,792,458 m/sec now) in his equations, he derived it from two constants: electric and magnetic densities of space (and by recognizing light as an electromagnetic wave). Einstein took it even further: nothing can exceed the speed of light, even by combining of a close-to-**c**-speed carrier and a close-to-**c**-speed projectile — still the projectile will hit a target at a combined speed below **c**. **The speed of light is nothing but the definition of local-to-the-area second (time unit): second is time span, during which light travels 299,792,458 meters in this area.** We already discussed above that time speed varies from area to area, and so is second. Next, in Chapter 29 we discussed time as a filler/ether of space, and that speed of light is restricted by viscosity/density of the time fabric. Second question answered: any speed is restricted by speed of time (or by local second). And **c** as 299,792,458 m/sec is just a way of measuring a local second.

Now to the blobs of slow time floating around in a faster time, like in this lava lamp demonstration:



https://www.youtube.com/watch?v=eLLfOVkp6so

We are looking at the time million or billion times slower than today, meaning for 1 second of time back then, million or billion seconds would pass today. That means that 299,792,458 m/sec speed limit, with “sec” that was back then, translates into 299 m/our-sec or 0.299 m/our-sec in today’s second (our clock ticks million or billion times faster than back then). Now, let’s consider a **blob A** of 10 billion times slower time, **floating in area B** of time that is only a million times slower. Let’s say blob A is floating at 1% of B-local speed limit, which is 299,792,458 m/B-sec speed limit, or 299 m/our-sec speed limit. 1% of this speed limit is about **2.99 m/our-sec**. Now imagine another larger **blob C**, having billion times slower time staying in the way of **blob A**. Speed limit inside **blob C** is 299,792,458 m/C-sec, or **0.299 m/our-sec**. To summarize:

- speed limit inside blob A is 0.0299 m/our-sec
- speed limit inside area B is 299 m/our-sec
- speed limit inside blob C is 0.299 m/our-sec
- blob A was moving at speed 2.99 m/our-sec inside area B, and that was OK, as it is well below speed limit inside area B.

Now to the next question: **3) What happens when blob A, moving at speed 2.99 m/our-sec, collides with larger blob C?**

Blob A has 10 times slower time than blob C has, so blob A is still contained as a blob inside faster time of blob C, and it starts penetrating inside blob C at its current speed of 2.99 m/our-sec, exceeding speed limit of 0.299 m/our-sec inside blob C! Even more, as we saw in chapter 2, blob A gets a speed boost, because it comes from faster time of area B into slower time of blob C. In chapter 11, we discussed what happens when **c**-speed-limit is violated: blob A will burn time on its path through blob C, so time on this path becomes faster, and that lets blob A through. (Or on the contrary, blob A gets burnt out completely before it exits blob C). Time burning means particles/antiparticles/photons were created on that path. We'll get some matter and a trail inside blob C with a faster time. But there is more. In chapter 2 we discussed that time dilation gradient (coming from quantum fluctuations discussed in chapter 18) bends trajectory of any projectile: when blob A crosses the border from faster time area B to slower time blob C, blob A gets an extra push inside blob C in the direction perpendicular to “B | C” border. This way blob A is routed toward the direction to the center of blob C, even if blob A trajectory inside area B was far from being perpendicular to “B | C” border. Now we have full answer to the 3rd question:

3.1) A passage of faster time will be created inside blob C. This passage crosses blob C not far from its center (if there is such). Matter and light are generated during passage of blob A through blob C by time burning on this path, and some of this matter is carried away by blob A on exiting blob C on the other side.

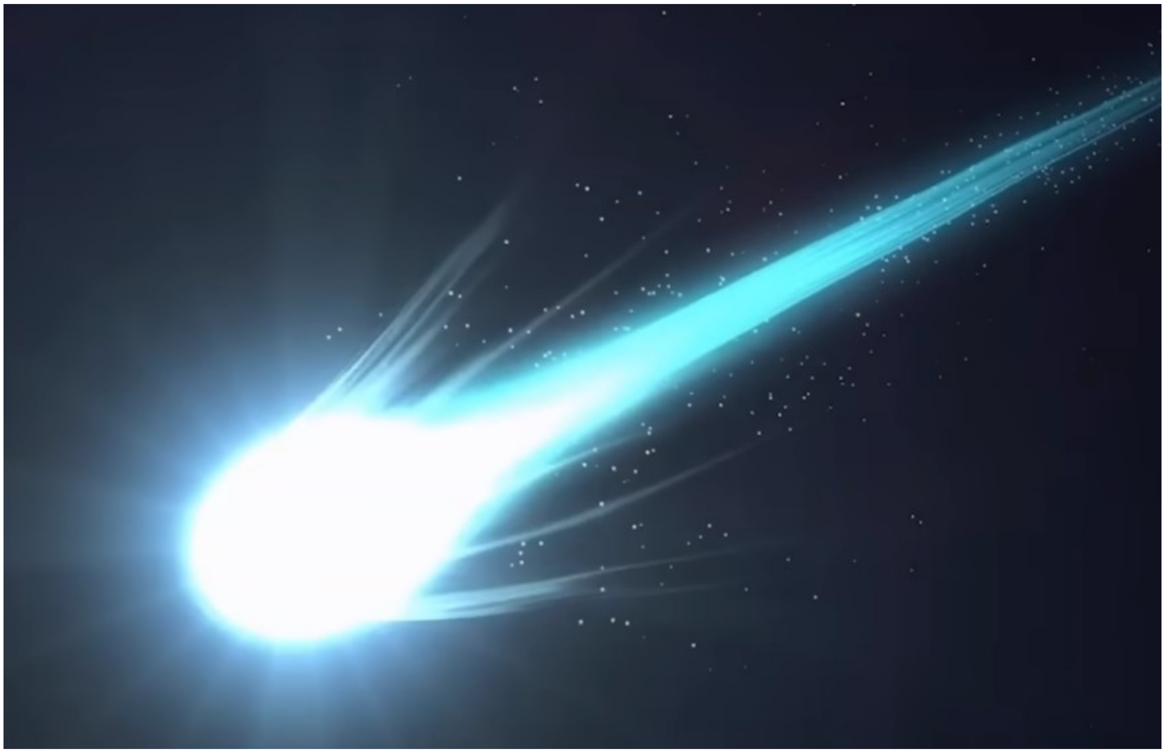
By now, we spent 55 minutes (or less) allocated by Einstein for ruminating on a problem, and we are ready for (less than) 5-minute conclusion:

3.2) This way **blob C becomes a spiral galaxy**, for now with a straight pair of arms, which will bend eventually (remember Einstein’s “everything moves”, in this case everything contained in blob C, see a **reminder below *)**. Later, with another projectile similar to blob A passing through blob C (and again, not far C center), this galaxy C can get an extra pair of arms.

3.3) And **blob A becomes an elliptical galaxy**, with some stuff carried away from the collision with blob C.

***) You still remember that slower time areas tend to contain stuff, because faster time around such areas acts as the barrier, right? Literally / physically, because of faster time quantum fluctuations pushing back.**

So, galaxies were materialized by burning slow time, with shooting-star-like fireworks of matter

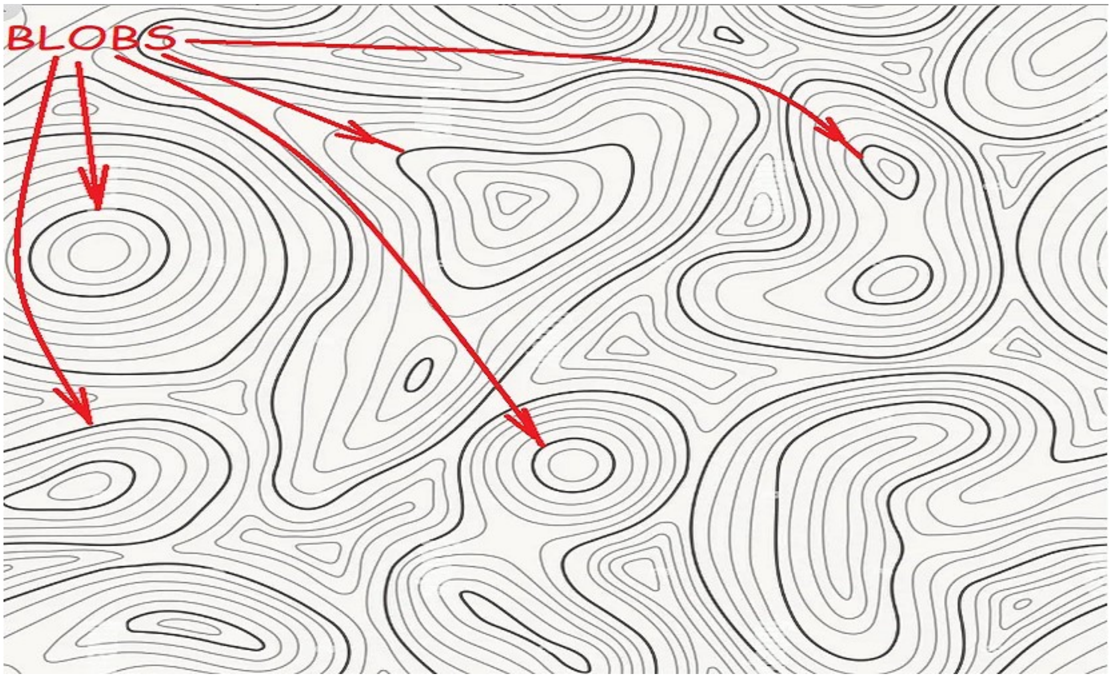


with such events randomly scattered in space and in time. It was not a single Big Bang like event, neither from a singularity, nor all over the space at once.

P.S. I exaggerated time differences in the example to simplify the work with numbers, but the effect of time burning would be the same even with **c**-speed-limit exceeded only by 0.1%: then a path with 0.001 faster time shall be burnt. Such 0.001-time difference we discussed/observed in chapter 2 for arms in spiral galaxies.

P.P.S. Answer to typical question: “Where do the blobs come from?”

You make the same mistake as Isaac Newton and we all did, because our senses tell us so: “Time is Absolute”, meaning time passage is the same everywhere and always. Isn’t that funny that Newton came out with gravity math/model first, then acknowledged that he does not know what causes gravity? And he started the “Gravitational Agent” search. As it turned out (thanks to Einstein), time is not absolute, for example, a second near the Earth is about a nanosecond longer than away from the Earth, and such miniscule time difference weighs a lot on us. Our senses are ignorant about the extra nanosecond, but are fully aware about the outcome from this difference — gravity. And time differs not only from place to place, but with time — time speed changes: clocks tick twice faster now than they did 14 billion years ago, and 12 times faster than 32 billion years back. “Where do the blobs come from?” originates from the “Absolute Time” belief, which is flat time, which reminds me of flat Earth belief. But the Earth has mountains and valleys, and relief of the land changes with time.



topographic map

And so is (and even more so was) time not flat (not evenly pacing) in space.

52. NO MORE ANTIMATTER ENIGMA

Prior to chapter 51, where galaxies were identified as the birthplace and containers of matter (and antimatter), we explored two possible explanations on antimatter whereabouts:

- **Macro-Idea in Chapter 5.** Antimatter and Matter Universes are huge blobs/containers of slow time (and of matter or antimatter), and we are in one of an infinite number of Matter Universes.
- **Micro-idea in Chapter 50.** Particles and antiparticles are symmetrical and stable in a static time environment, but can react differently to our time acceleration (since time loses its energy to matter/antimatter, and time becomes less energetic, thus, faster).

In chapter 51, we understood that the origin of matter/antimatter is not the Big Bang or Big Universe, but galaxies, or to be more precise, matter/antimatter originates in collisions of originally matterless blobs of slow time. Abundance of such objects and such collision events gives a statistical explanation of antimatter whereabouts. With an infinite number of such blob collisions, it is probable that a projectile blob (blob A in chapter 51) leaves the collision site with some excess of, let's say, antimatter, while the blob (blob C in chapter 51), through which the projectile blob went through, keeps excess matter. The elliptical galaxy, which blob A becomes (3.3 in chapter 51), is an antimatter galaxy. And blob C (3.2 in chapter 51) becomes a spiral matter galaxy.

It is a predictable outcome of big-numbers game, when something improbable becomes certain with big numbers, popularly explained in chapter 21 example:

Having $10K and 1 hour, find a person who gets all heads in row on 10 tosses of a coin. Result should be reproducible: within another hour and with $10K you should find another person getting all heads in row on 10 tosses.

Antimatter/matter annihilation problem solved: imbalance between them is local to a galaxy, but is in perfect balance in the Universe.

Major mysteries in cosmology solved and Bob Lazar's craft physics explained in this book.

— Started by Newton search for the Agent of gravity is over: push from quantum fluctuations is the Agent. To be precise, it is the difference in pushes by quantum fluctuations due to time difference/dilation.
— Quantum Fluctuations are Time or Universal Clock (everywhere, outside in space, and inside atoms and particles = canned time).
— Matter comes from Time burning (matter = canned time).
— Conservation of Energy: Slow time is more energetic than fast time. Time speeds up in the Universe by giving up its energy to Matter.
— $E=mc^2D^2$ is Einsteinian formula adjusted for time dilation D inside matter.
— Stability of an atom (aka "strong force") strongly depends on the atomic clock/time dilation D as $\sim D^5$.
— The same physics debunks Dark Science and confirms Bob Lazar's story.

Practical outcomes:
— We are not alone, and it is not a figment of Bob Lazar's imagination.
— Dinosaurs died because the Sun left the Scutum-Centaurus arm of the Milky Way, and such events are periodic.
— Time dilation technology not only counters gravity but cuts through / evaporates any material.

This technology is ancient, from some archeological dug out, according to what Bob Lazar was told. That should solve the mystery of 70-ton granite beams carved and installed in Egyptian pyramids, once people with brushes step forward.

Beyond Cutting Edge with Bob Lazar

Alexandre Kassianthouk

PhD in Physics and Mathematics